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Author(s): Sian Esther Giddins

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# Parents' Understanding of Front of Pack Orange Juice Labelling.

Sian Giddins

0916330

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requirements of the University of Chester for the degree  
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## **Abstract**

**Background:** Previous studies have demonstrated the difficulties consumers face in understanding FoP labels of foodstuffs despite the government's effort to introduce a system to ensure they are understood by all. A previous study (FSA, 2002) has demonstrated that knowledge regarding the terminology used on FoP orange juice labels was poor. Orange juice is the most popularly consumed juice within the UK (Galaverna, et al., 2008) and it has been shown that primary school aged children consume the highest amount of fruit juice (Bates, Lennox, & Swan, 2010).

**Objective:** This study investigated the knowledge of parents of primary school aged children in relation to their understanding of orange juice labelling. The study also investigated the purchasing factors which affect the selection of the orange juice purchased. Both of these results will be compared in terms of Social-economic status (SES), age, the school recruited from, gender, level of education and perceived nutritional knowledge.

**Methodology:** Questionnaires were distributed to all parents of two schools of different indices of multiple deprivations (IMD) to gain quantitative and qualitative data, a total of 130 participants were recruited, n = 95 from the school of low IMD and n = 35 from the school of high IMD.

**Results:** Despite differences in the response rates between schools of varying IMD, knowledge and understanding of the terminology displayed on front of pack (FoP) orange juice labels was poor across all demographics. The vast majority of participants purchased a juice which they didn't perceive to be the healthiest form; purchasing behaviour was shown to be greatly influenced by price.

**Conclusion:** Price is a major factor in purchasing behaviour which may lead consumers to purchase a juice of lower quality as a response to tighter constraints on household budgets. Consumers still demonstrate poor knowledge in terms of the understanding of the terminology used on FoP orange juice labels despite efforts to

increase consumer use and understanding of FoP labels of foodstuffs. Simplifying the terminology and wording used on FoP orange juice labels would be an effective way of enabling consumer understanding as current packaging is not understood by the major demographic groups.

*Keywords:* Front of pack (FoP) orange juice labels; Indices of multiple deprivations (IMD); Parents; Knowledge.

### **Declaration**

I hereby declare that work contained herewith is original and is entirely my own work (unless indicated otherwise). It has not been previously submitted in support of a Degree, qualification or other course.

Name:

Signed:

Date:

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## **Abbreviations**

CO <sub>2</sub>	Carbon Dioxide
BSDA	British Soft Drink Association
DoH	Department of Health
IMD	Indices of Multiple Deprivation
FAO	Food and Agriculture Organization
FoP	Front of Pack
FSA	Food Standards Agency
GDA	Guideline Daily Amounts
MTL	Multiple Traffic Light
NDNS	National Diet and Nutrition Survey
PSAQ	Parent Self-Administered Questionnaire
SES	Social-economic Status
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

## **1.0 Introduction**

### **1.1 Overview**

A healthy diet has been linked to good health for many years with ongoing research continually discovering new associations between food and health which can be both beneficial and detrimental. Public health nutrition aims to promote good health through the promotion of a healthy balanced diet which will also result in the primary prevention of nutrition related diseases (Gibney, Margetts, Kearney, & Arab, 2008).

Due to the growing amount of evidence linking diet and health, legislation is continually being implemented and modified in order to effectively communicate health messages to the purchaser (van Trijp, & van der Lans, 2007). Front of pack (FoP) labelling is evolving in order to allow consumers to make informed food choices which could then result in a healthier diet (Borgmeier, & Westenhoefer, 2009).

All consumers have the right to know the nutritional value of the foodstuffs they consume; however multiple studies have previously documented the difficulty consumers' face when examining the nutrition information displayed on FoP labels. These difficulties are varied but include issues such as legibility, complexity and the amount of detail displayed (Food Standards Agency [FSA], 2006).

A review study commissioned by the Food Standards Agency (FSA, 2007) concluded that consumers felt that clear and honest information should be displayed on all labels in order to allow for maximum consumer choice. The review also documented that greater clarity is required regarding terms such as 'fresh' and 'pure', two terms which are commonly seen on the labels of fruit juice. Consumers have also demonstrated a preference for simple and clear labelling as complex

labelling has been shown to negatively impact the understanding of labels. By simplifying food labels more consumers will be encouraged to take a greater interest in the healthiness of food (FSA, 2010).

One of the key target populations of current health promotion campaigns are those of low socio-economic status (SES) who commonly live in deprived areas. It is these individuals who are more prone to developing chronic diseases in comparison to those of middle and high SES. This may be linked to poor diet due to a lack of intake of fruit and vegetables and high intakes of convenience foods which are high in fat, salt and sugar (Germov, & Williams, 2008).

A number of strategies have been proposed based on the available evidence in order to reduce health inequalities within the United Kingdom (UK) (Marmot, et al., 2010). These include:

- Reducing inequalities in childhood to reduce inequalities in later life (Marmot, et al., 2010, pp. 22).
- Reducing inequalities in educational outcomes (Marmot, et al., 2010, pp. 24).
- Improving access to jobs and reducing long-term unemployment (Marmot, et al., 2010, pp. 26).
- Implementation of a minimum income to ensure healthy living for all (Marmot, et al., 2010, pp. 28).
- Reducing the impact of climate change and scale of health inequalities (Marmot, et al., 2010, pp. 30).
- Priority prevention of disease which are strongly related to health inequalities (Marmot et al., 2010 p 32).

The relevance of these strategies will be discussed further in section 2.2. However, all are important to ensure the social gradient of health, which signifies health inequalities, becomes less evident in society and that all individuals are provided with the same opportunities.

The White Paper 'Choosing Health' was produced in order to develop clear strategies in health promotion that would be accessible to all. One of these strategies is the promotion of fruits and vegetables using the '5 a day' message which aims to ensure that all individuals consume at least five portions of fruits and vegetables a day due to its health benefits. This equates to 400g/day; an amount suggested based on epidemiological evidence (Department of Health [DoH], 2004). As a result of the '5 a Day' campaign the consumption of fruit juice has been gradually increasing over the years (Bates, Lennox, & Swan, 2010) since it counts for one portion. However, despite orange juice being the most popular juice (due its high content of vitamin C) to promote good health (Galaverna, et al., 2008), the understanding of the terminology used on FoP orange juice labels is poorly understood by the general public (FSA, 2002), and this warrants further study.

## **1.2 Aims and Objectives**

**Principle Aim:** Assess the knowledge of parents of primary school children (within the selected population) regarding the terminology used on FoP orange juice labels in comparison to SES, IMD, age, gender, perceived nutritional knowledge and educational qualifications.

**Secondary Aim:** Determine the broader factors which are involved in purchasing behaviour such as general shopping pattern behaviour, perceived nutritional value of orange juice and the environmental effect of food transportation.

**Objective:** Determine parental understanding of the terminology used on FoP orange juice labelling through the distribution of a questionnaire in the selected schools. For comparison purposes, the population for this study has been selected by catchment areas of the two schools invited to participate in the study, with one school being located in an area of high deprivation and the other in an area of low deprivation. Levels of deprivation of both schools are based on the indices of multiple deprivation (IMD) which were obtained from personal communication with the schools.

### **1.3 Research Questions**

This report will address the following research questions:

- What is the level of understanding of parents of school children in relation to labelling of orange juice?
- Do SES, IMD, level of education, age and gender affect knowledge of orange juice labelling?
- Which factors contribute to purchasing behaviour?

## **2.0 Literature Review**

This review will explore the literature on food labelling with the emphasis being placed on the labelling of orange juice. Food labelling of all food stuffs will be discussed as only a limited amount of literature exists regarding issues relating solely to orange juice labelling. The review will also examine the factors which affect shopping behaviour and whether participants consider the environmental impact of transporting oranges or orange juice to the UK.

### **2.1 Food and Health**

In 2004 the government released a set of principles in order to support the public in making healthier and more informed choices with regards to health, this is known as the 'Choosing Health: Making Healthier Choices' White Paper (DoH, 2004). The paper highlights the needs for the transformation of food labelling into a 'clear and straightforward' coding system to allow the consumer to identify healthier choices by the development of 'at-a-glance' or FoP nutritional information. Examples of 'at-a-glance' nutritional information include the 'Multiple Traffic Light' (MTL) and 'Guideline Daily Amounts' (GDA) labelling system. These were intended to simplify the labelling of foodstuffs thereby allowing those of all educational levels to make a more informed decision regarding healthy dietary choices (Murphy, 2007).

However, despite the partial success of these labelling systems confusion still remains due to the variation in these 'at-a-glance' labelling systems, particularly as certain food suppliers use their own system (Stockley, Jordan, & Hunter, 2010). It has also been shown that the MTL is used more commonly when making health choices due to the speed in which consumers can identify the health benefits and as it is more 'attention-grabbing' than GDA which can sometimes be difficult to use despite being more informative (Murphy, Fallows, & Bonwick, 2008). However as

GDA provide the true nutritional value of food, educating the consumers on how to use this labelling system will be beneficial (Bussell, 2005).

Poor diets have repeatedly been linked with poor health, for example convenience foods are known to be high in salt, sugar and saturated fat, all of which increase the risk of developing cardiovascular disease (Mozaffarian, & Clarke, 2009). Poor diets are more common in those in lower income groups which may suggest that behavioural factors are a major cause of health inequalities with those of lower SES suffering from more health inequalities (Lambert, Dibsall, & Frewer, 2002).

## **2.2 The Social Gradient of Health**

Since 1997 the importance of tackling health inequalities has been brought back to the national policy agenda (Harrington, et al., 2009). The social gradient of health denotes the phenomena which simply describes the relationship between social class and health with those of higher social position maintaining better health than those of lower classes. That is, each social class has its own position on the gradient in terms of hierarchy of health (Marmot, & Wilkinson, 2006).

Health inequalities are evident in the UK and worldwide with many campaigns such as the 'Programme for Action' attempting to narrow the health gap between those of varying SES. SES can affect individuals in more ways than one and can have a 'snowballing' effect on their lifestyle (DoH, 2010). For example those with lower levels of education may face an increased probability of being long-term unemployed and therefore a lower amount of money to spend on healthy foodstuffs. Individuals whose real life situation mirrors this example have an increased tendency to be those of low SES (DoH, 2004). This relationship can be viewed in Figure 2.1, which depicts how multiple factors both interact or act independently to influence health.



Figure 2.1: The main determinants of health (Dahlgren, & Whitehead, 1991).

### **2.3 Five a Day**

The World Health Organization (Food and Agriculture Organization [FAO], & World Health Organization [WHO], 2005) has stated that an individual should consume 400g of fruits and vegetables a day in order to prevent chronic diseases such as cancer, heart disease, diabetes and obesity and to prevent micronutrient deficiencies. Fruits and vegetables are also full of antioxidants (Ruxton, Gardner, & Walker, 2006) and generally low in fat and calories (DoH, 2003).

In the UK this message is promoted by the '5 a Day' campaign in which adults are encouraged to eat five 80g portions of fruits and vegetables each day (DoH, 2004). This has resulted in an increase in the amount of fruit and vegetables which are consumed; however, the increase in fruit intake may be partially due to the increase in the consumption of fruit juices (Bates, et al., 2010; Ashfield-Watt, Welch, Day, & Bingham, 2005).

However, one glass of fruit juice only counts as one of an individual's '5 a Day' as it contains little fibre (Steptoe, Perkins-Porras, McKay, Rink, Hilton, & Cappuccio, 2003). Despite this information being publicised many still consume more than one portion of fruit juice a day due to the ease of their availability, convenience and marketing strategies which makes fruit juice appear as a superior way to achieve adequate nutrition (Gupta, & Gupta, 2008).

## 2.4 Orange Juice Consumption Patterns

As previously mentioned the recent 'National Diet and Nutrition Survey' (NDNS) has recorded an increase in consumption of fruit juice in all groups apart from women (aged 19-64) and older girls (aged 11-18 years) (Bates, et al., 2010). When comparing the consumption of fruit juice, fresh, canned or dried fruit the results varied by age group and gender as demonstrated in the Figure 2.2.

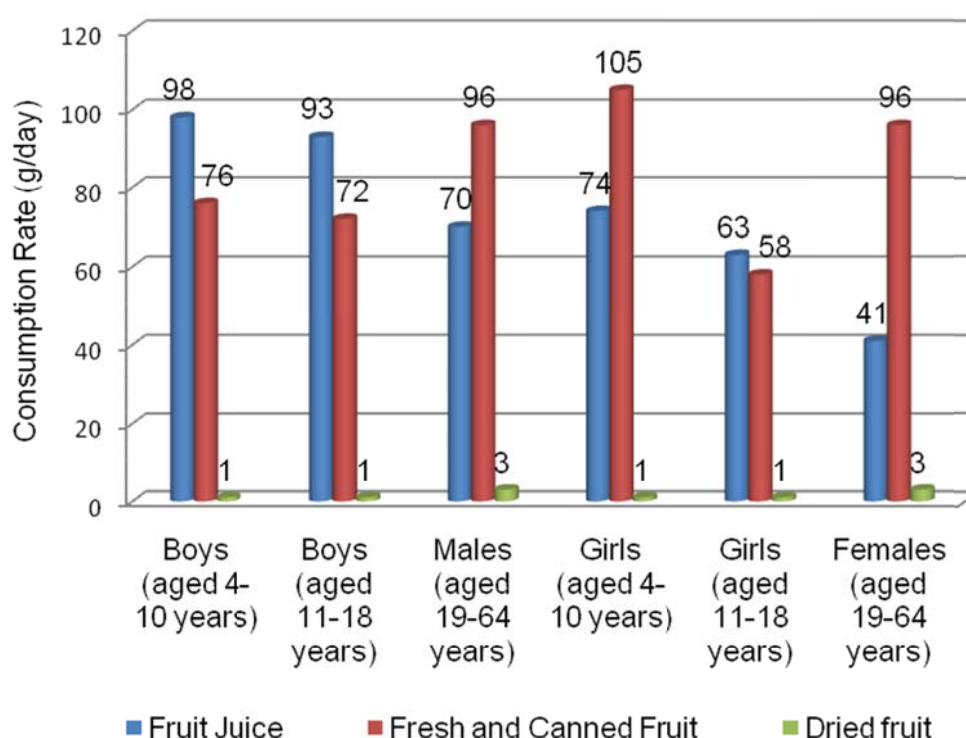


Figure 2.2: The consumption rates of fruit juice, fresh and canned fruit and dried fruit (Bates, et al., 2010).

As can be seen from Figure 2.2 fruit juice consumption is higher than the consumption of any other form of fruit for boys aged 4-18 and for girls aged 11-18 years. There are several possibilities as to why this may occur such as a lack of availability of fruits in the home, influence of parental dietary habits, peer pressure to opt for less healthy snacks (Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005). Despite children consuming more fruit juice than adults, it is the adults who inevitably purchase the juice that the children consume. As a result of this it is essential that adults fully understand the terminology used on the labels of such fruit juices in order to ensure the juice they select is of good nutritional quality.

Each year consumers spend £1815 million on fruit juice within the UK, of which 55% of the 1.2 billion litres of juice consumed is orange juice (British Soft Drink Association [BSDA], 2010). Orange juice is the most popular with the population as a whole due to its fresh flavour and its higher nutritional benefit based on the fact that its high vitamin C content helps to maintain a healthy life style. Some studies have even discovered a positive association between consuming high levels of orange juice and good health. High consumption rates can decrease the risk of free radical related oxidative damage and therefore reduce the incidence of cancer, neurological diseases and cardiovascular disease as a result of its high concentration of anti-oxidants (Galaverna, et al., 2008).

As orange juice is so widely consumed it could be assumed that there would be widespread understanding of the terminology used on orange juice labels. However a study by the FSA (2002) discovered that consumers did not fully understand the commonly used terminology on the labels of orange juice. This study was an observational cross-sectional survey in which the researchers randomly recruited those who regularly bought orange, apple, pineapple or grapefruit juice. This simply

means that individuals were required to purchase at least one type of juice and at least once a month.

In this survey 318 of those recruited met the inclusion and exclusion criteria, and face-to-face interviews were conducted to obtain quantitative data regarding their knowledge of orange juice terminology. Following this, a further 17 participants were asked to complete a more in-depth interview on the same topic in order to obtain qualitative data. The aim of the study was to discover if consumers understood the most commonly used terms found on orange juice labels which are 'from concentrate', 'not from concentrate', 'pure', 'freshly squeezed' and when the term 'pure' was combined with other terms. This was achieved by the following three methods:

1. Initially the participants were asked to describe what they thought each term meant to them un-prompted.
2. Following an un-prompted answer the participants were then shown a number of possible statements in which they were required to identify the correct definition for each form of juice.
3. Photographs of examples of orange juice labels were then shown to the participants in order to determine how opinions changed when a label contained more than one description such as 'Pure Juice from Concentrate' (FSA, 2002).

Upon data analysis it was confirmed that not a single term was correctly identified or defined by all participants with individual opinion changing upon prompting. It also demonstrated increased confusion with certain participants when combinations of descriptions were used. Despite a poor understanding of the terms, the majority of participants found that FoP of fruit juice was easy to understand. However this may be as a result of personal preference resulting in the purchasing of the same

product repeatedly and therefore resulting in knowing only the meaning of one description. Upon analysing participant shopping and purchasing behaviour, multiple factors were involved in the decision making ranging from personal circumstances such as cost to marketing strategies and in-store positioning (FSA, 2002).

## **2.5 Regulation of Orange Juice Labelling**

To ensure that all consumers receive the same finished product regardless of branding a 'Fruit Juice and Fruit Nectars Regulations' was established in 1977 and further updated in 2003. In order to ensure the information remains up to date the legislation was last reviewed in 2007 (FSA, 2007). These regulations were put in place to allow evidence-based research to become accessible to all (Greenhalgh, 2010).

The principal aim of the legislation is to distinguish between juice 'not from concentrate' and 'from concentrate'. The former is used to describe a juice which is made purely from the juice which is extracted from the fruit with no added water. The fruits can either be squeezed and transported to its country of destination as the finished product or the fruits can be transported and squeezed at its country of destination. This legislation also ensures that juice 'not from concentrate' is 100% fruit juice as no additional water is added at any stage of the production (FSA, 2007).

Juice made 'from concentrate' involves the fruit being squeezed in the country of production and the juice then undergoing evaporation processes to reduce the volume of juice. This is then transported to its country of destination where water is then added back to the evaporated juice. Only the same amount of water that is extracted from the fruit juice can be added back. Juice made 'from concentrate' may

taste slightly different to that of juice 'not from concentrate' but the former is more cost-effective to transport (FSA, 2007). Juice 'from concentrate' must adhere to strict guidelines to prevent any unnatural changes occurring to the juice (Lee, & Coates, 1999).

The legislation also provides strict guidelines regarding the functional fortification of orange juice with vitamins and minerals, as well as sugar, all of which can be added as long as it is clearly stated how much of each substance has been added. However, only 150g of substances may be added to each litre of juice. This rule does not apply to juicy bits as these are merely the fleshy parts of the fruit which may be added back to the juice following pasteurization (FSA, 2007).

Vitamin C is added to orange in its synthetic form, known as ascorbic acid, to increase the natural content of vitamin C within the juice. This is done as both natural and synthetic forms of vitamin C are lost both aerobically and anaerobically (Tiwari, O'Donnell, Muthukumarappan, & Cullen, 2009) due to storage conditions, packaging and the processing method involved with the production of orange juice. Further research is still required to investigate the most effective way for orange to retain as much as possible of its natural vitamin C content during production (Polydera, Stoforos, & Taoukis, 2003).

Two other commonly used descriptions used on FoP juice labels, 'freshly squeezed' and 'pure', are not covered by the legislation as there are currently no legal definitions to cover these terms. 'Freshly squeezed' juice should only have a short time frame between the extraction of the fruit juice and selling the juice. The FSA recommend that this timeframe does not exceed two weeks therefore the "use by date" will be within two weeks of juice extraction (FSA, 2007). As freshly squeezed juice doesn't undergo pasteurization or include preservatives, once opened the shelf

life of this juice dramatically decreases as bacteria spores are able to grow here (Lee, & Coates, 1999). This form of juice should also not be made from a concentrate, and therefore does not include any additional water. 'Pure' juice should not include additives or sugar and can be used when describing both 'from' and 'not from concentrate' juice (FSA, 2007).

## **2.6 Parental Understanding of the Labelling of Foodstuffs**

Multiple studies have investigated consumer understanding of FoP labelling of foodstuffs as food intake directly affects health (Maubach, Hoek, & McCreanor, 2009). The development of the at-a-glance, FoP labelling system was designed to help consumers make healthier choices at the point of purchase, however consumer confusion arose due to the disagreement between the government, supermarkets and manufacturers in how best to format FoP labels (Feunekes, Gortemaker, Williams, Lion, & van den Kommer, 2007).

There is a distinct lack of evidence in terms of how parents use food labels when purchasing foodstuffs. This omission needs to be addressed as parents are the nutritional gatekeepers responsible for selecting the majority of foodstuffs which children consume (Maubach, et al., 2009). Parental views and experience in relation to the use of the labelling of foodstuffs therefore need to be addressed (Brown, Ogden, Vögele, & Gibson, 2008).

Parents of children living at home have been shown to have a greater interest in food labelling (Grunert, & Wills, 2007). However, when purchasing foodstuffs the vast majority of parents feel that pressure from their children, adherence to routine, the need to quickly complete their shopping and the urge to buy familiar brands outweigh the need to examine nutritional labels. As a result, individual knowledge regarding the selection of foodstuffs dependent on their nutritional value displayed

on FoP labelling is undermined by price, marketing and pressure from children. These considerations therefore have a greater influence on selection than the nutritional value of foodstuffs (Maubach, et al., 2009). This evidence has been supported by numerous research papers which state that families don't read nutrition labels when shopping for foodstuffs (Nørgaard, & Brunsø, 2009; Grunert, & Wills, 2007).

A study by Murphy (2007) demonstrated that parents from lower SES identified more barriers to the use of the FoP labelling systems GDA and MTL. However, this study only included 106 participants whereas a larger study of over two thousand participants demonstrated no difference in the understanding of multiple FoP labelling systems between any demographic categories (Feunekes, et al., 2007).

## **2.7 Food Shopping Habits**

Shopping for foodstuffs is an essential part of life, how and when individuals shop varies from individual to individual but these habits are characterized by repetition of defined time intervals such as once a week as well as multiple purchasing goals. However, both these factors can be further modified, for example in-store stimuli such as layout, product information and brands can affect an individual's buying goal. A variety of factors determine how individuals shop which include economic status, educational knowledge, location of shops and pressure from peers, society and family (Park, Iyer, & Smith, 1989).

There are two main forms of shopping trips for foodstuffs. The first is known as a 'one stop' trip, this is an individual's main shopping trip in which the majority of food items are purchased usually from one or two major retail supermarkets. The choice of supermarket varies dependent on personal preference for shop layouts, location, cost, taste and may not always be the closest store geographically. The second



form is known as a 'top-up' shopping trip when essentials such as milk and bread are required or if specific brands and ethnic food are required. This store may differ from the 'one stop' shop as it is selected in terms of convenience and location as opposed to cost (Clarke, & Banga, 2010; Piacentini, Hibbert, & Al-Dajani, 2001).

Where the public opt to shop for foodstuffs has now changed, partly as a result of the success of supermarkets as most of the population of the UK are now shopping in free-standing, car based superstores and not local shops. This has raised concerns about the diminishing number of local stores caused by the increasing number of superstores. The latter increasingly control the market due to their ability to competitively price their foodstuffs (Hallsworth, de Kervenoael, Elms, & Canning, 2010). Most of the larger supermarkets are located on the outskirts of towns and city centres which increases the travelling distance to these stores. However, being able to purchase the vast majority of foodstuffs and other items under one roof and generally at a lower price than stores located within the centre of towns and cities outweighs the travelling time (Hsu, Huang, & Swanson, 2010; Webber, Sobal, & Dollahite, 2010).

Some countries still favour local shops which source their food locally and therefore foodstuffs have a smaller carbon dioxide (CO<sub>2</sub>) footprint (Wortmann, 2004). Local and convenience stores are not only a source of foodstuffs but also play a vital part in the local community due to the familiarisation between customers and staff which in turn enhance the feeling of being part of a community. To those who live in isolated communities or do not have access to transport these local stores are vital as they can't visit the larger supermarkets to purchase foodstuffs (Clarke, & Banga, 2010). These individuals place a higher value on the local stores not only for their supply of foodstuffs but also to drive the local economy. However, if it is possible for these individuals to visit the larger store it is important for these individuals to visit a

store which is fully stocked with all the goods which they require (Webber, et al., 2010).

Unfortunately these smaller stores can't competitively price their products against those set by the big name superstores because if they did they would not make enough profit to remain open. This results in those people who are unable to visit the larger supermarkets paying more for the same product (Clarke, & Banga, 2010).

## **2.8 Brand Power**

There are many factors which influence our shopping and purchasing habits, one of the major factors are that of 'brand power'. Brand power is highly valued by both customer and retailer as a satisfied customer with a preference to a particular brand will continue buying the specific product which results in increased sales and therefore profits for the retailer. Many factors influence which brand an individual purchases such as enjoyment of the product, recommendations from peers, personal history, appearance, in shop positioning and advertisements (Chang, & Chieng, 2006). Each year it is noted that individuals spend more and more time in front of the television, as a result the number of advertisements for foodstuffs on the television has also increased. However, the range of products advertised remains limited. The amount of food advertisements shown during children's television has increased in proportion to that of childhood obesity, thus demonstrating a significant relationship between advertisements and purchasing patterns (Fiates, Amboni, & Teixeira, 2008).

There is now a growing competition between brands produced for a specific supermarket against global brands. Store branded foodstuffs help gain customer loyalty by offering exclusive products for a variety of price ranges as well as directly increasing store profits by 25-50% in comparison to selling the equivalent globally

branded product. Such is the competition between store and global brands that supermarkets are beginning to see themselves as their own food brand and not a distributor of manufactured brands. The leading store brand in the UK accounts for 40% of all foodstuff sales, suggesting that the sale of certain foodstuffs is dominated by store branded merchandise which results from increased marketing campaigns of store branded foodstuffs (Semeijn, van Riel, & Ambrosini, 2004).

However, those items which are sold at a lower, discounted price, both store branded and global brands, which are branded as 'value for money' may be of lesser quality than the premium ranges. Despite containing mostly the same ingredients, they may of lower nutritional quality due to lower amounts of vitamins and minerals and a higher number of added chemicals (Darmon, Caillavet, Joly, Maillot, & Drewnowski, 2009).

## **2.9 Environmental Impact of Orange Juice**

The majority of foodstuffs available today have travelled a great distance from their place of manufacture to the final consumer. In the early 1990's the term 'food miles' was coined in order to describe this pathway. Foods with a higher amount of food miles having a greater negative impact on the environment because of the greater release of greenhouse gasses during transportation (Kemp, Insch, Holdsworth, & Knight, 2010). As a result of globalization, the distance that certain foodstuffs, such as oranges or orange juice, travels from source to consumer has greatly increased and this negatively impacts the environment due to an increase in global warming (Pretty, Ball, Lang, & Morison, 2005). Globalization has allowed the consumer to purchase most big named brands in any part of the world, with a vast majority of international brands being sold in the UK (Young, 2004). As a result, there is now growing pressure for this trend to be reversed and for localization to be promoted (Weber, & Matthews, 2008).

In relation to oranges, only certain countries have the optimal climate to grow these fruits with Brazil, the United States of America, Mexico, India, China and Spain growing the largest amounts (Food and Agricultural Organization of the United Nations, 2005). Due to the large distances of these countries from the UK, transporting oranges and orange juice into the UK will lead to a large accumulation of food miles. The amount of carbon emissions released are dependent not only on their transportation from manufacturer to consumer but also on how the product was produced, such as growing and processing techniques, and the distance from consumer to landfill (Edwards-Jones, et al., 2008).

Transportation costs will vary dependent on the price of fuel and applicable taxes and this will result in an increased cost of foodstuffs. Therefore if it is possible to produce foodstuffs locally this will not only save the consumer money but also reduce the carbon footprint of the food industry which will benefit the environment (Pretty, et al., 2005).

Although it does not have the natural climate to grow oranges, it is possible to grow oranges in greenhouses in the UK. This wouldn't fully eliminate the transportation distance for oranges and orange juice but would greatly lower the distance. In order to satisfy demand however, a vast area would be required to build these greenhouses (Cowell, & Parkinson, 2003) and to further reduce the carbon footprint organic fruits could be even more beneficial (Pretty, et al., 2005). However, the feasibility of such schemes would need to be investigated.

## **2.10 Aims and Objectives of the Study**

To summarise, this study has been designed to assess the knowledge of parents of primary school children regarding the terminology used on the labels of orange

juice. The population was selected as it is children aged between 4-10 years who consume the highest amount of fruit juice but it is parents who purchase the fruit juice and therefore parents' knowledge will be assessed. Knowledge of the terminology used will be assessed in terms of SES, IMD of school, age, gender and educational level of each participant. The study will also investigate factors which affect general purchasing behaviour as well as gaining a more in depth view of the factors which influence the purchasing of orange juice in particular. Additionally the study aims to discover whether if further information was provided regarding the terminology of orange juice labelling would this alter purchasing behaviour.

It is hoped that the aims of the study will be achieved through an analysis of completed questionnaires distributed to the selected schools. The questionnaire is designed to provide the following information:

- Participant age, gender, SES and level of education.
- Generate a profile of those who drink fruit juice on a regular basis.
- Determining knowledge of terminology used on FoP orange juice labelling.
- Factors which affect purchasing behaviour of the consumer.
- Determine consumer interest in food and orange juice labelling, gauge the importance of the information present on labels and how additional information may alter this interest.
- Determine if the participant considers the environmental impact of food globalization.

Following these objectives it will be possible to analyse and collate the data collected to answer the research question as stated in section 1.3.

### **2.11 Study Hypothesis**

It is hypothesized that knowledge of FoP labelling of orange juice will not be affected by SES, IMD of the school and level of education.

## **3.0 Methodology**

### **3.1 Study Design**

Questionnaires are psychometric instruments which have the ability to collect both quantitative and qualitative data. A well devised questionnaire can be used as a means to collect data regarding people's knowledge, attitudes, beliefs and behaviour (Greenhalgh, 2010).

This study used both quantitative and qualitative methods in order to determine the understanding of orange juice labelling of parents of primary school children through the distribution of a questionnaire. Quantitative data was collected in order to provide robustness to the findings whereas qualitative data provided a means to explore the rationale of the findings. Qualitative data will result in the understanding of individual participant experiences and beliefs to provide a phenomenological approach (Fade, 2003) to the understanding of FoP orange juice labelling and expand the themes in more depth.

The study design was an observational cross-sectional survey. The questionnaire determined an association between individual knowledge of orange juice labelling (dependent variable) and SES, IMD of the school, level of education, age and gender (independent variables) at one time point only.

The parent self-administrated questionnaire (PSAQ) was designed to obtain the following information:

- Background information – Age, gender, highest level of education, eligibility to receive free school dinners and perceived nutritional knowledge, this information was required to determine if these factors (as well as the school attended) affected the following.

- Participant shopping and purchasing behaviour, both in general terms and relation to orange juice purchasing.
- Factors that contributed to parental preference or non-preference when selecting orange juice.
- The level of understanding of FoP orange juice labelling.
- Use and ease of understanding of FoP orange juice labels.
- Concerns or barriers to the use of FoP labelling.

The questions used were a combination of validated and non-validated questions the majority of which were obtained from two previously validated studies investigating knowledge of fruit juice labelling (FSA, 2002) and parental knowledge of FoP labelling systems (Murphy, 2007).

The remaining questions were devised by the researcher and were not validated due to a lack of time before the end of the school term. The questionnaire mostly contained close questions in order to enable easy data coding however open-ended questions were also used to obtain qualitative data which were not pre-determined by the researcher. See Appendix I for justification of questions included within the questionnaire.

As the questionnaire was that of a PSAQ nature no training was required in order to conduct the research and a larger number of participants were recruited than would have been possible if the questionnaires had been administered by the researcher (Fehily, & Johns, 2004). However, this could have led to some discrepancies when inputting the qualitative data due to misinterpretation of the answers provided, for example due to illegible handwriting. However, discrepancies can still arise when using non self-administered questionnaires and the method used for this study provided more data within a shorter time span.



Despite the benefits of the use of PSAQ, it may result in some limitations such as respondent bias in relation to who completed the questionnaire and that self-reporting may be influenced by social desirability which will affect the validity of the results.

### 3.2 Population and subjects

Participants were recruited to volunteer in the research from two primary schools in Mold, Flintshire (see Appendix II for permission letters). In order to maintain anonymity the schools were named school A and B, of which only the researcher and supervisor knew the true name of the schools. The schools are not named in the report due to ethical and confidentiality issues. The number of children that are eligible to receive free school dinners (see Table 3.1) was provided to the researcher in order to compare the SES level of the schools. This information could be classed as confidential which is why no school names are used throughout the report.

Table 3.1: The number of children attending each school and the percentage which are eligible to receive free school dinners.

School	Number of Families	% of school children receiving free school dinners
School A	190	7.6
School B	130	30

Mold has been ranked 152<sup>nd</sup> out of 190 regions in terms of levels of deprivation in education, skill and training thus as a whole Mold is classed as an area of low deprivation (Welsh Assembly Government, 2008). However, upon comparing the number of children who received free school dinners and the amount of funding provided to each school, that is their level of IMD, a significant difference was

observed between the two schools which allowed for knowledge to be assessed in terms of SES. SES was established in terms of the eligibility of children to receive free school dinners as those who are eligible for free school dinners must be receiving one of the following:

- Income Support
- Job Seekers Allowance
- Child Tax Credit
- State Pension Credit

### **3.3 Sample Size Calculation**

In order to calculate an adequate sample size the power analyses programme G\*Power 3.1 was used which is commonly used in behavioural, social and biomedical sciences (Faul, Erdfelder, Buchner, & Lang, 2009). A sample size of 137 was required in order to be able to demonstrate a significant association between knowledge and SES, IMD of the school, level of education, age and gender (see Appendix III for the sample size calculation), however in order to allow for incomplete questionnaires a further 14 individuals (10%) were required making a total of 152 individuals to be recruited.

As both schools surveyed totaled 320 families there was a 111% increase in the number of families required in comparison to how many were invited to volunteer for the study. However, as questionnaires are known to have a low response, with typical non-response rates of 20-40% (Martikainen, 2007), all families were still invited to take part in the research. High recruitment numbers were essential as questionnaires which have a low response rate are not representative of the population group selected (Fehily, & Johns, 2004).

### **3.4 Inclusion and Exclusion Criteria**

The single inclusion criteria required for the research was that only one questionnaire was to be completed by the main food purchaser of each household in order to ensure that duplicate questionnaires were not submitted. Incomplete or multiple submissions of a questionnaire were excluded from the analysis as were questionnaires which were submitted by those below the age of 16. The latter because of ethical reasons as they are below the legal age of consent. It was also decided that those who work in the field of Dietetics or Nutrition were to be excluded as it is expected that their knowledge will be far greater than the average participant and will therefore affect the survey's validity.

### **3.5 Procedure**

An information pack which contained a covering letter, participant information sheet and a validated self-administered questionnaire (Appendix IV) were distributed to each family within both schools through the schools normal procedure, for example by the eldest child of each family. This allowed participants to complete the questionnaire at home which would allow participants to spend as much time as necessary completing the questionnaire. This is more advantageous to the participant than completing the questionnaire at the school under timed conditions and will therefore allow for the participant to provide more in-depth answers to the questions (Fehily, & Johns, 2004). By completing the questionnaire participants consented to their replies being analysed and assessed in order to determine their knowledge of orange juice labelling.

Participants were asked to return the completed questionnaire in the sealable envelope provided by July 9<sup>th</sup>, 2010. On this date a reminder slip was sent out to the families, in the same method as the information packs, in order to inform the parents that the final submission date for the questionnaire had been extended to July 14<sup>th</sup>,

2010. An extension to the submission date was implemented in order to achieve the highest possible number of returned questionnaires (Shih, & Fan, 2008). All returned questionnaires were held by the school secretaries for safe keeping until the researcher collected the returned questionnaires on July 9<sup>th</sup> and 14<sup>th</sup>, 2010.

This procedure was adapted from a Food Standards Agency study (FSA, 2002). Participants in that study were required to provide their own personal opinion regarding the terminology used on orange juice labels and this provided the qualitative data. They were also asked to select an appropriate definition for each form of orange juice from a selection, however they were not asked to provide a definition of the terminology when presented with photographic material. This amendment was conducted as results were collected by means of PSAQ and not by conducting face-to-face interviews which were used in the original study.

Also, as the full interview script detailing which questions were asked regarding shopping behaviour from the FSA (2002) study is unavailable it is unsure whether the same questions were used. In order to ensure that validated questions were used in the questions to assess shopping behaviour appropriate questions were selected from an additional research study examining the understanding parent's use of FoP labelling (Murphy, 2007).

Low response rates to questionnaires have been shown to be partially due to participants having difficulties in following the questions asked (Boynton, & Greenhalgh, 2004). This is why piloting the questionnaire to ensure all questions are validated is essential in order to gain feedback regarding wording and clarity of the questions for the target audience (Wall, DeHaven, & Oeffinger, 2002). However, due to time constraints in response to school term times it was not possible to pilot the questionnaire devised specifically for this study. In an attempt to overcome this

time problem, the questionnaire, as well as all other material which was distributed to participants, were discussed with the headmistresses of both schools used in the study as well as multiple teachers and headmasters of other schools in the area. This was done to ensure the language used was appropriate for the target audience. Also, as almost 80% of questions within the questionnaire were derived from validated questionnaires, it was not vital for the questionnaire to be piloted.

### **3.6 Data Management**

The completed questionnaires from both schools were collected and randomly coded, this could be done as it is clearly stated on the completed questionnaire which school the questionnaire was returned to. By randomly coding the questionnaires complete anonymity is ensured, this was been implemented despite no identifiable questions such as participant name, date of birth or occupation being present on the questionnaire.

All data and results will be securely stored in a username and password protected file for ten years on the hard drive of a computer which was and will only be accessible to the main investigator. The data was also backed up on a personal memory stick which was kept in a safe deposit box at the researchers' home. When transporting the memory stick to a different site, it was ensured that the memory stick was continually safe and secure. All paper copies of the questionnaires have been shredded and disposed of in confidential waste bags after ensuring that all data has been correctly inputted onto the computer and thoroughly checked.

Information collected during this study was not used for any further research.

### **3.7 Data Analysis**

The questionnaire was designed to test the following null hypothesis:

- Knowledge of FoP labelling of orange juice was not affected by SES, level of IMD and level of education.

#### *Analysis of Quantitative Data*

Quantitative data was analysed by the use of the software package 'Statistical Package for the Social Sciences' (SPSS) (Version 17, SPSS, Chicago, Ill., USA). As all quantitative data was analysed with SPSS all answers were coded in a pre-determined format by the researcher. This allowed for descriptive statistics to be conducted on all questions in order to summarize the data collected.

In order to determine the most appropriate test to analyse the results it was essential to consider the following factors:

- The questionnaires were only distributed once; therefore there were no repeated measures.
- Results will be compared between two primary groups i.e. between both schools.

It was determined that 'Chi-Squared' ( $X^2$ ) was the most appropriate test to determine the associations between SES, IMD level of the school, educational level, age and gender in terms of knowledge regarding FoP orange juice labelling. However, if any of the cells had an expected count of less than 5 then the Chi-squared test was unreliable. It was possible to overcome this limitation by regrouping certain groups, for example to form a 2x2 table which would provide a Fisher's Exact statistic. When a 2x2 was present the value of the Fisher's Exact p value will be used in place of the value obtained from Chi-Square testing. If the table still contained values which were unreliable Cramer's V testing will be used in order to determine correlations and their significance.

When asked to select the correct definition regarding the terminology used on FoP orange juice labelling the answers were marked as correct or incorrect. Each of the five questions was worth equal marks equivalent to 20% which would allow the participants to score a maximum of 100% if all five questions were answered correctly. The following rankings were implemented to distinguish between varying levels of knowledge: no knowledge (0%), poor (20%), average (40%), good (60%), very good (80%) and excellent (100%). However, when inputting the data into SPSS it was noted which definition was selected by each participant in order to compare the quantitative data with that collected from qualitative data.

Cross tabulations were then performed in order to investigate how differences in SES, IMD level of the school, educational level, age and gender affected the knowledge of FoP orange juice labelling. This was conducted in order to investigate the differences in knowledge levels between each group, for example between those whose children did and didn't receive free school dinners.

#### *Analysis of Qualitative Data*

Qualitative data has been collected in order to 'explore, interpret and obtain a deeper understanding' (Greenhalgh, 2010) regarding individual knowledge and views regarding the labelling of orange juice. There were several possible ways to analyse the data, one of which required the use of a computer-assisted qualitative data analysis software (CAQDAS) which can be used to improve rigour, speed, sampling and coding of qualitative data (Seale, Gobo, Gubrium, & Silverman, 2007).

However, as only a few questions provided qualitative data and the majority of answers were only short it was decided that the use of some software was not required. As a result the data from each individual question was inputted into a Microsoft Excel spread sheet in order to analyse the results. Analysis was

undertaken by conducting line-by-line coding of the words in themes and sub-themes which allowed for individual cognition and for comparison against the defined variables (SES, IMD level of the school, educational knowledge, age, gender). Themes were standardized across groups for ease of comparison. To achieve authenticity, the raw data was quoted under the theme heading when analysing the results (Fade, 2003).

When no answers were provided for questions which required qualitative information it was assumed that the participant didn't know the answer or have an opinion on the matter.

These key themes were then converted into bar charts or pie charts where applicable in order to produce a diagrammatic representation of the results which demonstrated the response rate to each theme.

Statistical analysis was conducted on the themes identified by the use of SPSS in the same manner as with quantitative data, which was by Chi-Square, Fisher's Exact and Cramer's V testing.

Following the coding process it was then possible to transform the qualitative data into quantitative data which could be inputted into SPSS to allow for the comparison of qualitative and quantitative data. This process was not only used to directly compare qualitative and quantitative versions of the same questions but also to compare qualitative data with data that is not its quantitative equal.

#### *Comparison of Quantitative and Qualitative Data*

As both qualitative and quantitative data were inputted into SPSS it was possible to compare both sets of data. This allowed the researcher to determine how individual



opinion changed when un-prompted (qualitative data) to then being prompted (quantitative data). This was conducted as the FSA (2002) study demonstrated a change in opinion when participants were prompted in comparison to when no prompts were provided.

### **3.8 Ethical considerations**

Ethical approval was provided by the Research Ethics committee from the University of Chester Faculty of Applied and Health Sciences in order to ensure the quality and integrity of the research. A copy of the letter confirming ethical approval can be viewed in Appendix V. Gaining ethical approval ensures that neither the participants nor researcher will be exposed to physical and psychological harm or risk. This procedure also ensures that the participants are recruited voluntarily and have consented to take part in the research and that all collected information will be kept confidential and only accessible to those directly involved in the study.

## 4.0 Results

### 4.1 Response and Attrition Rates

330 questionnaires were distributed between both schools A and B and a total of 130 were collected resulting in a 39% response rate. No questionnaires were excluded as all complied with the inclusion and exclusion criteria noted in section 3.4. Figure 4.1 presents an overview of the overall useable sample obtained.

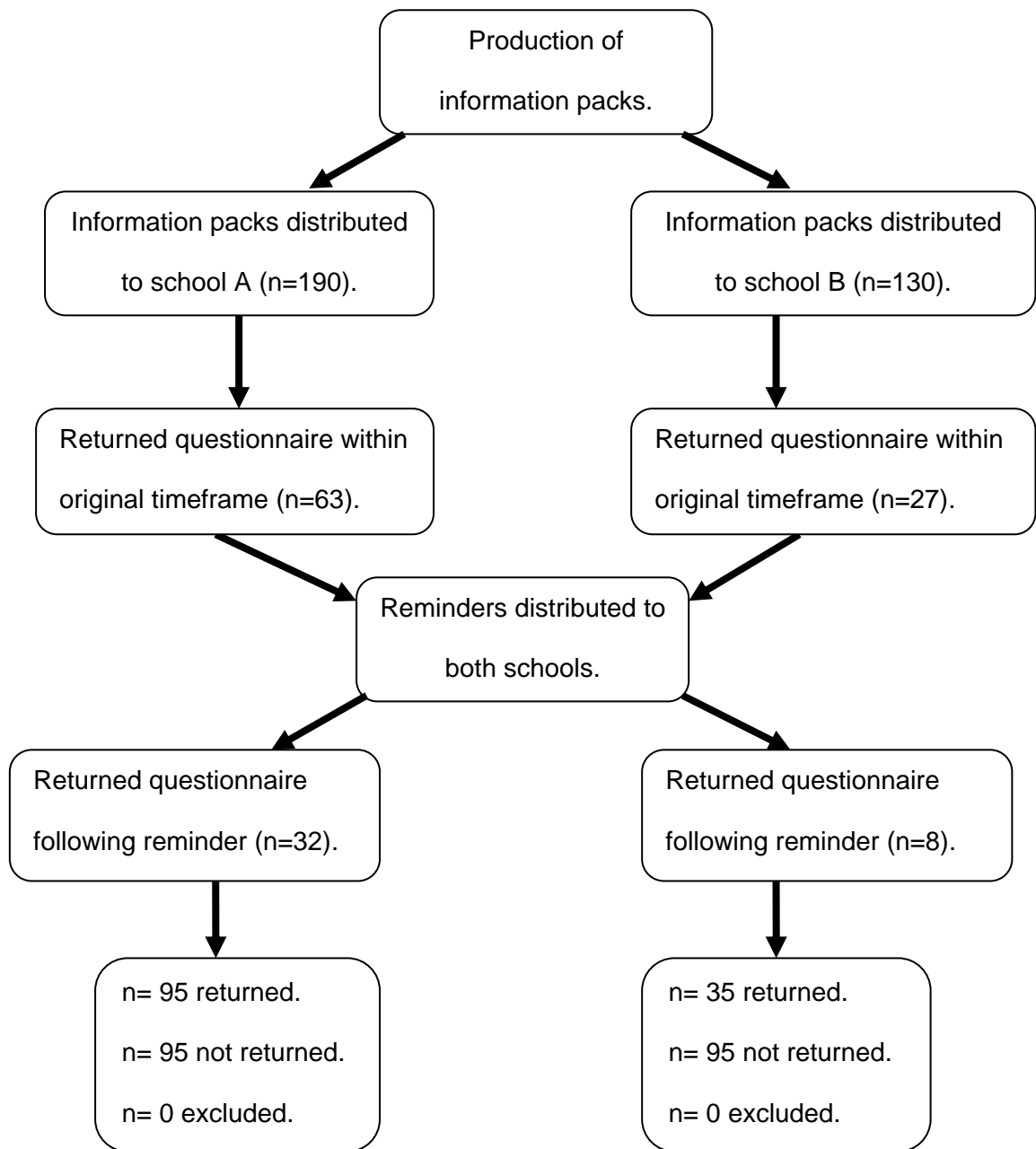


Figure 4.1: Number of participants recruited at each stage.

The following sections will discuss the demographics of the useable sample obtained from the information derived from completed questionnaires as well as knowledge of FoP orange juice terminology.

## 4.2 Participant Characteristics

Descriptive statistics were used in order to gain an insight into the variety of participants recruited from each school. Participants from both schools were kept separate as both schools varied in IMD, this allowed for SES of participants to be compared.

Table 4.1: Participant response rate (n = 130).

	<b>School A (Actual number and per cent)</b>	<b>School B (Actual number and per cent)</b>
<b>Total Response Rate</b>	95/190 (50%)	35/130 (27%)
• Number of Males	25 (26.3%)*	8 (22.9%)*
• Number of Females	75 (78.9%)*	27 (77.1%)*
<b>Age Range</b>		
• 17-24 years	5 (5.3%)*	7 (20%)*
• 25-34 years	30 (31.6%)*	8 (22.9%)*
• 35-44 years	34 (35.8%)*	4 (11.4%)*
• 45 years or over	26 (27.4%)*	16 (45.7%)*
<b>Nutritional Knowledge</b>		
• Very Knowledgeable	18 (18.9%)*	9 (25.7%)*
• Average Knowledge	71 (74.7%)*	22 (62.9%)*
• Not very Knowledgeable	6 (6.3%)*	4 (11.4%)*
<b>Level of Education</b>		
• No qualifications	2 (2.1%)*	2 (5.7%)*
• 1+ GCSEs (any grade)/ NVQ level 1/ Foundation Level GNVQ/ Equivalent	7 (7.4%)*	8 (22.9%)*
• 5+ GCSEs (Grades A-C)/ 1+ A or AS level/ NVQ L2/ Intermediate GNVQ/ Equivalent	13 (13.7%)*	12 (34.3%)*
• 2+ A-levels/ 4+ AS levels/ NVQ L3/ Advanced GNVQ/ Equivalent	13 (13.7%)*	8 (22.9%)*
• First Degree/ Higher Degree/ NVQ L4 or 5/ HNC or HND/ Equivalent	60 (63.2%)*	5 (14.3%)*
<b>Number receiving free school dinners</b>	12 (12.6%)*	12 (34.3%)*

\* These response rates are the percentages derived from response rates of each school i.e. from 95 or 35 participants, and not from the number of distributed questionnaires i.e. from 190 or 130.

Table 4.1 clearly demonstrates the demographics of the participants from both schools. School B, which has a lower SES standing than school A, has a higher number of younger parents in comparison to school A, that is 20% of participants from school B were aged between 17-24 years in comparison to 5.3% from school A.

A clear difference between the educational levels of participants from both schools can also be observed, with the majority of participants from school A being educated to a degree level or equivalent (63.2%) whilst the average highest qualification from school B was 5 or more GCSEs or the equivalent (34.3%). A higher percentage of participants from school B were also eligible to receive free school dinners than school A (34.3% and 12.6% respectively).

Similarities in the response patterns from both schools are evident in certain aspects, such as the majority of participants were female from both schools (78.9% from school A and 77.1% from school B). Perceived nutritional knowledge was also similar between both schools with the majority stating their nutrition knowledge was average, 74.7% and 62.9% of participants from schools A and B respectively.

In order to gain results which may be significant certain variables were regrouped, this was conducted on age and level of education. The age range was simply modified to two groups, those who were younger than 34 (72.6% in school A and 54.3% in School B) years and those who were over 35 years of age (27.4% in school A and 45.7% in school B). Level of education was divided into those who had less than a first degree or equivalent (36.8% in school A and 85.7% in school B) and into those who had equal to or more than a first degree or equivalent (63.2% in school A and 14.3% in school B).

### **4.3 Food Shopping Habits**

The majority of participants went food shopping once to twice a week; this was true for those from school A and B (66.3% and 77.1% response rate respectively). Once again the common duration of shopping visits was similar for both schools of which the average visit lasted thirty minutes to one hour of which 43.2% of participants from school A and 51.4% from school B selected.

Under half of participants from both schools (44.2% from school A and 45.7% from school B) shopped on their own. The remainder of the participants either shopped with another adult or their children, here the responses differed between schools. Those who were recruited from school A were most likely to shop with a child (28.4%) whereas those from school B were most likely to shop with another adult (37.1%). Significant associations between schools and shopping with a child or adult were evident following Fisher's Exact testing ( $p = 0.033$  and  $p = 0.038$  respectively). Significant associations also emerged following Fisher's Exact testing between the regrouped categories of age and shopping with children, with a significant association emerging between age and shopping with children ( $p = 0.029$ ).

Supermarkets were the most frequented stores from participants recruited from schools, 72.6% of participants from school A and 65.7% from school B. This resulted in a higher percentage of participants from school B frequenting discount supermarkets (11.4%) or a combination of supermarkets and discount supermarkets (17.1%) in comparison to those recruited from school A (9.5% and 12.6% respectively).

Consideration of the impact which food transportation has on the environment, such as food miles, produced equal results of which 52.6% of participants from school A

and 48.6% from school B did consider the environmental impact of food transportation.

#### **4.4 Orange Juice Buying Behaviour**

The majority of participants purchased orange juice once or twice a week or once a fortnight, with those from school A more likely to purchase orange juice once or twice a week (42.1%) and those from school B commonly purchasing juice once a fortnight (40%). However there was no significance with the frequency of orange juice purchasing and schools. Significant association was apparent between gender and those who purchase orange juice once to twice a week following Fisher's Exact testing ( $p = 0.026$ ).

Those from school A regularly purchased branded juice (37.9%) whereas those from school B purchased supermarket own standard range of juice (45.7%). However, participants from both schools selected their juice from the chillers and not the shelves (71.6% from school A and 65.7% from school B). Once again no associations were observed between schools and branding, however a modest, significant correlation was observed between the regrouped categories of age and buying branded juice (Cramer's V testing:  $V = 0.261$ ,  $p = 0.031$ ).

When asked to state which juice the participants regularly purchased and which they perceived to be healthiest (as depicted in Figure 4.2) the most commonly purchased juice was not what the majority of participants perceived to be healthiest. The most common juice bought was that 'from concentrate', of which 33.7% from school A and 40% from school B bought. A modest, significant correlation was observed between perceived nutritional knowledge and buying juice 'from concentrate' (Cramer's V testing:  $V = 0.217$ ,  $p = 0.046$ ).

However, only 1.1% from school A and 5.7% from school B perceived this to be the healthiest form of juice, a modest, significant correlation was observed between this belief and original groupings of level of education ( $V = 0.285$ ,  $p = 0.032$  following Cramer's V testing).

The juice which was perceived healthiest was 'freshly squeezed', of which 71.6% from school A and 57.1% from school B selected, despite only 1.1% and 5.7% (participant response rate respectively) regularly purchasing. A modest, significant correlation was observed between those who bought 'freshly squeezed' juice and perceived nutritional knowledge ( $V = 0.234$ ,  $p = 0.028$  – Cramer's V testing).

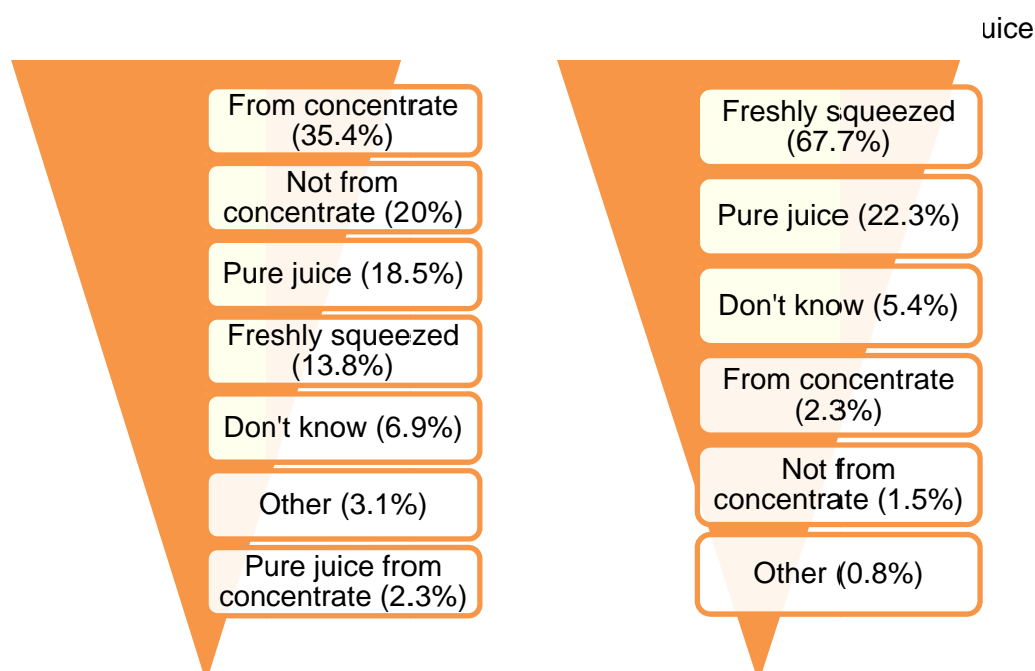


Figure 4.2: Comparison of the most commonly purchased form of orange juice and the juice which is perceived healthiest.

Table 4.2 summarises the participant response rate in terms of which five factors most influence the type of orange juice bought. Price was the most popular factor when selecting the type of orange juice consumed, receiving 116 responses out of a possible 130 (89% response rate). Following a Cramer's V test a modest but significant correlation was observed between price and age (regrouped) ( $V = 0.344$ ,

p = 0.009) and educational knowledge (original groups) and price (V= 0.0219, p = 0.041).

A significant association was observed between quality and educational level (following regrouping) of which p = 0.033 for Fisher's Exact test when examining an association between the selection of the theme and educational level.

Table 4.2: The number of participants who selected each factor in terms of importance.

	Not important	Least important	Not very important	Fairly important	Important	Most important
<b>Being branded</b>	88	13	9	9	8	3
<b>Being from the chill cabinets</b>	75	17	17	0	7	4
<b>Being supermarket own brands</b>	100	10	8	8	3	1
<b>Price</b>	14	17	25	22	15	37
<b>Nutritional value</b>	44	14	11	17	23	21
<b>Quality</b>	31	9	15	14	30	31
<b>Pressure from others</b>	124	3	1	0	0	2
<b>Pressure from children</b>	90	11	9	10	5	5
<b>Taste</b>	45	7	13	24	24	17
<b>Appearance</b>	96	14	10	5	4	1
<b>Does not contain juicy bits</b>	91	11	9	7	7	5
<b>Contains juicy bits</b>	111	7	3	3	3	3

Despite the fact that pressure from children or others scored low scores of importance, correlations and associations were observed between these factors and multiple variables. For example a Cramer's V test detected modest correlations with significance between pressure from children (scored out of five) and age (not regrouped) and eligibility to receive free school dinners (V = 0.308, p = 0.001 and V



= 0.316,  $p = 0.024$  respectively). The same results were observed when comparing the original age categories and original educational level categories ( $V = 0.340$ ,  $p = 0.002$  and  $V = 0.302$ ,  $p = 0.019$  respectively) to the simple selection of the themes. Fisher's Exact tests also demonstrated significant association between age and educational level (both regrouped) with the selection of the theme pressure from children ( $p = 0.005$  and  $p = 0.004$  respectively).

Modest, yet significant, correlations were also observed between original age categories and schools with the scoring of 'pressure from others' ( $V = 0.225$ ,  $p = 0.020$  and  $V = 0.0267$ ,  $p = 0.026$  respectively) following Cramer's V testing.

Despite the majority of participants purchasing orange juice from the chillers there were only two significant associations, both of which were age (original and regrouped groups) with the selection of being from the chillers ( $\chi^2=13.573$ ,  $df=3$ ,  $p = 0.004$  following Pearson's Chi-Square test and  $p = 0.005$  as a result of Fisher's exact test).

#### **4.5 Knowledge of Orange Juice Terminology**

Both qualitative and quantitative data were collected regarding the understanding of the terms used on FoP orange juice labelling. From sections *i-v.*, when the statement un-prompted is used this describes results obtained from qualitative data, and quantitative data was obtained following being prompted i.e. through the selection of statements.

##### *i. From Concentrate*

Qualitative and quantitative data demonstrated a mixed understanding of the term 'from concentrate'. A broad range of themes appeared upon analysis of qualitative data when participants were asked to demonstrate their knowledge regarding the

term 'from concentrate' when not prompted. As can be seen from Figure 4.3 the most popular theme identified was that water was added to the juice thus forming a dilute orange juice:

“This is a cordial which needs water adding.” (Participant 97)

Only 19.2% of participants correctly stated that water is removed to produce a concentrate and then added back to re-form the juice prior to packaging when not prompted. A significant association appeared between the identification of this theme with schools and educational level (following the regrouping) following Fisher’s Exact test ( $p = 0.047$  and  $0.037$  respectively).

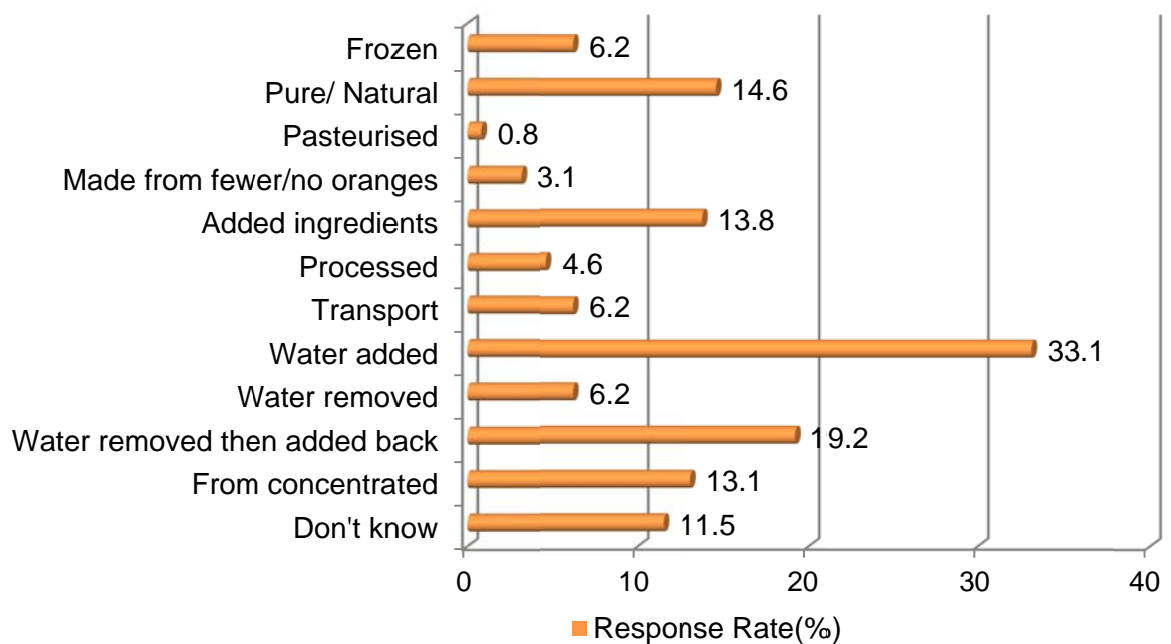


Figure 4.3: Response rates of participants for each theme identified to describe the term 'from concentrate'.

However, only 3.8% of all participants linked that the above process was conducted in order to ease transport of the juice, for example:

“Orange juice is dehydrated at source in order to ease shipping then water is added back at destination to create orange juice.” (Participant 9)

A modest yet significant correlation was formed between the identification of transport and gender ( $V = 0.218$ ,  $p = 0.013$ ) following Cramer's V testing.

A similar number of participants believed that this form of juice was more pure or natural to those who believed this form of juice contained added ingredients such as sugars, additives and preservatives:

“Straight from the fruit - nothing added.” (Participant 25)

Two significant associations were found between the identification of the theme pure/natural with schools and level of education (following regrouping) with Fisher's Exact testing producing significant values of  $p = 0.047$  and  $p = 0.045$  respectively).

A modest but significant correlation was observed between added ingredients and level of education (prior to regrouping) following Cramer's V testing ( $V = 0.275$ ,  $p = 0.044$ ).

A large majority of participants felt they didn't understand this terminology i.e. stated 'don't know'. This was strongly associated to level of education (following regrouping) ( $p = 0.049$  for Fisher's Exact test) and modestly but significantly correlated to level of education (original groupings) and school attended ( $V = 0.270$ ,  $p = 0.050$  and  $V = 0.211$ ,  $p = 0.016$  respectively).

Prompting also resulted in the majority of participants correctly identifying the correct definition for this form of juice (56.9% of all participants); however this was still far from universal.

A significant association was determined between the identification of the correct theme (highlighted in bold in Table 4.3) and level of education and age (both

variables following the regrouping process) ( $p = 0.008$  and  $p = 0.048$  respectively) following Fisher's Exact testing. A modest yet significant correlation was detected between the selection of the correct statement and original groups for level of education following Cramer's V testing ( $V = 0.282$ ,  $p = 0.035$ ).

The selection of the statement 'concentrate added' was strongly associated with level of education following regrouping ( $p = 0.033$  – Fisher's Exact test) and significant yet modest correlations were observed between this selection and level of education (original groups) ( $V = 0.335$ ,  $p = 0.006$  – Cramer's V tests).

Table 4.3: Response rates for each statement selected to describe the term 'from concentrate'.

Statement	Response Rate (%)
'The product contains additives or preservatives'	12.3
'The product is concentrated in the UK'	0
'The product is concentrated in region where the fruit is picked'	6.9
<b>'The product is made by removing water from the juice to make concentrate and then later diluting the concentrate back to original strength'</b>	56.9
'The product is a juice with concentrate added'	6.9
'The product is slightly stronger than normal as water has been removed from the juice'	8.5
'The product is slightly more dilute than normal, because the juice concentrate has water added'	7.7

Descriptive analysis demonstrated a vast difference in the numbers of those who selected a different statement to their personal opinion in the description of the term 'from concentrate'. Following the coding of qualitative data to correspond to each statement significant associations became apparent between those whose qualitative reply demonstrated no similar theme to the statement selected for

quantitative data ( $p = 0.043$  for school attended,  $p = 0.036$  for level of education [following regrouping] and  $p = 0.014$  for gender) following Fisher's Exact testing.

Fisher's Exact testing also demonstrated a significant association between those who correctly stated the removal followed by the addition of water and the school attended ( $p = 0.031$ ).

*ii. Not from concentrate*

Twelve key themes were identified when qualitative data regarding the understanding of the term 'not from concentrate' was analysed (see Figure 4.4). The vast majority of participants believed that this form of juice was a more pure or natural form of juice (23.8%). There was a modest and significant correlation between this belief and level of education (prior to regrouping) following the application of Cramer's V testing ( $V = 0.343$ ,  $p = 0.004$ ).

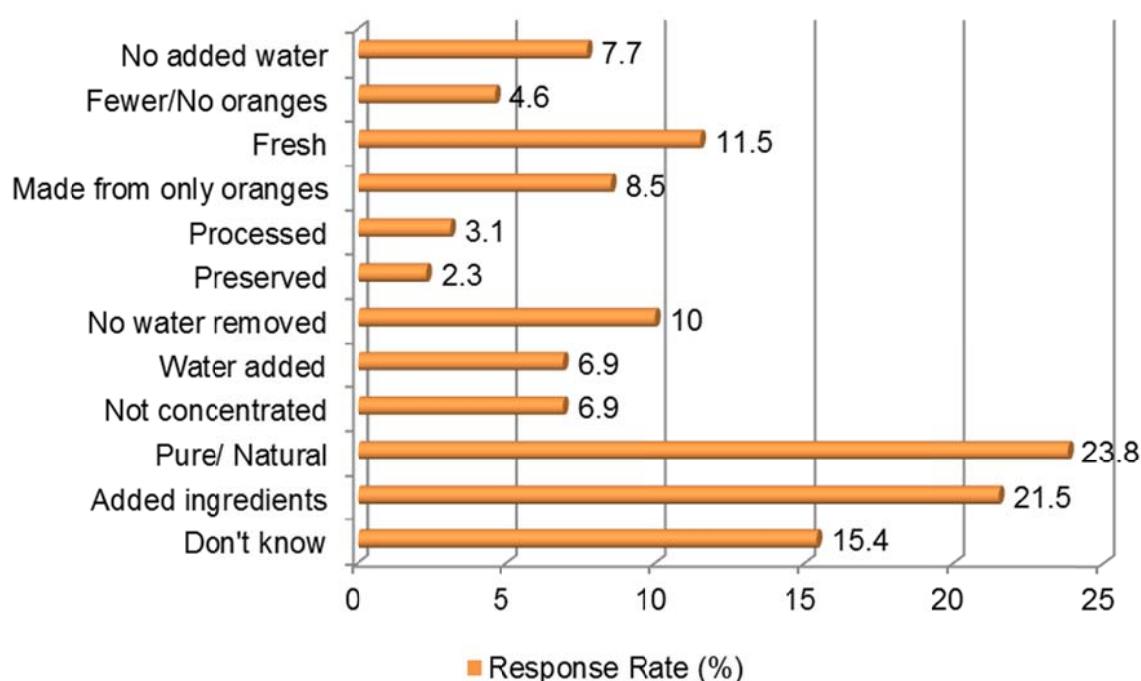


Figure 4.4: Response rates of participants for each theme identified to describe the term 'not from concentrate'.

However, a similar response rate was obtained to those who thought this form of orange juice contained added ingredients such as additives and preservatives (21.5%):

“Juice extracted from fruit then packaged with additional preservatives before being transported to the seller.” (Participant 29)

A significant association was observed between the identification of this theme following Fisher's Exact testing and with the regrouped categories of age ( $p = 0.039$ ).

Out of the five terms, this was the term that the highest number of participants didn't understand. Those who stated they didn't know what the term meant were strongly associated with level of education prior to regrouping (Fisher's Exact testing,  $p = 0.044$ ) and a modest, significant correlations post regrouping (Cramer's V testing,  $V = 0.277$ ,  $p = 0.041$ ) and perceived nutritional knowledge (Cramer's V testing,  $V = 0.215$ ,  $p = 0.050$ ).

Quantitative data demonstrated a lack of understanding of the term 'not from concentrate' with 23.8% of participants simply selecting 'the product is not concentrated'. This is a large increase when considering a mere 6.9% of participants stated the same when asked unprompted. The selection of this statement was strongly associated with schools and eligibility to receive free school dinners ( $p = 0.038$  and  $p = 0.028$  respectively) following Fisher's Exact testing.

There were no associations or correlations between the selection of the correct statement (highlighted in bold in Table 4.4) and any of the variables.

Table 4.4: Response rates for each statement selected to describe the term 'not from concentrate'.

Statement	Response Rate (%)
'The product is straight from the fruit'	13.8
'The product contains juicy bits'	0.8
'It is a premium product'	5.4
'The product is not processed'	11.5
'The product is not concentrated'	23.8
'The product has not been diluted'	23.1
'The product contains additives or preservatives'	5.4
'The product has not been pureed and had added water'	11.5
'The product was squeezed abroad and shipped to the UK'	3.1
'The product was squeezed in the UK'	1.5

Once again, the identification of themes varied between qualitative and quantitative data, however there was only a significant association ( $p = 0.039$  - Fisher's Exact test) between the eligibility to receive free school dinners and no similar theme apparent between participant answers for qualitative and quantitative data.

### iii. Pure Juice

The majority of participants (50.8%) correctly identified that 'pure juice' contained no added ingredients such as preservatives and additives when unprompted (see Figure 4.5), of which there were no strong or significant associations with any of the variables.

The second most popular theme was that this form of juice was only orange juice, of which 37.7% of participants described, but again no associations or correlations

were identified. Despite the similarities between these two themes they were separated as both themes were commonly mentioned:

“Orange juice that is just juice.” (Participant 19)

A similar theme to those mentioned above was that this form of juice is more pure and natural, following Cramer’s V testing a modest, yet insignificant correlation, was observed ( $V = 0.246$ ,  $p = 0.097$ ) between this belief and original grouping for level of education.

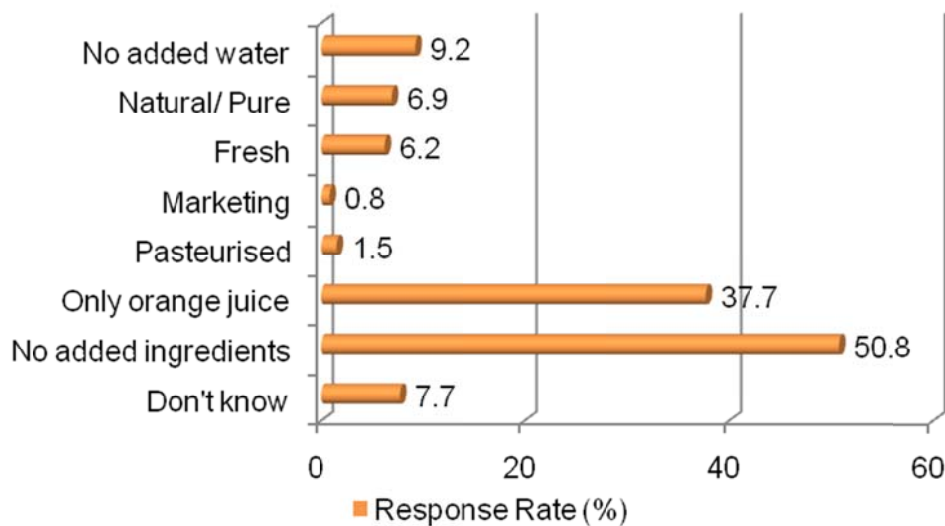


Figure 4.5: Response rates of participants for each theme identified to describe the term ‘pure juice’.

Significant associations were observed between those who didn’t know what was meant by this term and age (following regrouping of the groups) following Fisher’s Exact testing ( $p = 0.030$ ). Prior to regrouping of the age groups, a modest yet significant correlation was observed following Cramer’s V testing ( $V = 0.258$ ,  $p = 0.034$ ).

The term ‘pure juice’ is the only term which received homogeneous results from participants both when un-prompted and prompted. Over half the participants (53.8%) correctly selected that no food additives are present in pure juice when



prompted (see Table 4.5). However, as was observed with the analysis of qualitative data, there were associations or correlations with the identification of the correct theme and any variable.

Despite being the least popular answer, there was a modest but highly significant correlation ( $V = 0.341$ ,  $p = 0.001$ ) between perceived nutritional knowledge and the selection of the statement 'no added vitamin C' following Cramer's V testing.

Table 4.5: Response rates for each statement selected to describe the term 'pure juice'.

Statement	Response Rate (%)
'The product contains no added sugar'	19.2
'The product has been made from concentrated juice'	6.2
'The product contains no added vitamin C'	2.3
<b>'The product contains no added food additives'</b>	53.8
'The product has not been made from concentrated juice'	18.5

No associations or correlations were observed between the similarity of qualitative responses and quantitative responses between any variable.

#### *iv. Freshly Squeezed Juice*

'Freshly squeezed juice' resulted in the appearance of numerous themes when unprompted (see Figure 4.6), the most popular of which were 'fresh' and 'no added ingredients' (30.8% and 25.4%) respectively:

"Nothing else added, not pasteurized, totally fresh." (Participant 3)

"The juice is freshly made from squeezed oranges." (Participant 67)

There was a significant association with the belief that the juice was 'fresh' with gender and eligibility to receive free school dinners (Fisher's exact testing,  $p = 0.050$  and  $p = 0.047$  respectively). There was also a modest and significant correlation between perceived nutritional knowledge and this belief ( $V = 0.259$ ,  $p = 0.004$ ) following the application of Cramer's V testing.

Not all participants displayed an understanding of the timeframe between harvesting and squeezing the oranges to the sale of the juice within the stores. Less than 30% of all participants mentioned a specific time and this varied from squeezed on the day to recently squeezed.



Figure 4.6: Response rates of participants for each theme identified to describe the term 'freshly squeezed'.

Confusion arose in the question when participants could not identify how this form of juice was different from 'pure juice'; this confusion was not associated or correlated to any variable:

“Don't know the difference between this and pure juice - perhaps it's fresher?” (Participant 15)

A number of participants believed this terminology to be a ‘marketing tool’ or a gimmick in order to increase sales as it was believed that this form of juice can only be ‘homemade’:

“Juice pressed that day in my own kitchen - does not represent any item sold in stores.” (Participant 10)

There was a modest, significant correlation between those who didn't know what ‘freshly squeezed’ is and level of education (post regrouping) following Cramer's V testing ( $V = 0.212$ ,  $p = 0.016$ ). However, prior to regrouping this correlation was stronger but not significant ( $V = 0.255$ ,  $p = 0.077$ ).

Table 4.6: Response rates for each statement selected to describe the term ‘freshly squeezed’.

Statement	Response Rate (%)
‘There was a short time between harvesting the fruit and selling the juice in shops’	10.8
<b>‘There was a short time between extracting the juice and selling it in shops’</b>	29.2
‘The juice was made from fruit that has not been stored’	13.1
‘There was a short time between harvesting the fruit and packaging the juice’	13.1
‘There was a short time between extracting the juice and packaging the juice’	33.8

Table 4.6 displays the prompted results for 'freshly squeezed' juice, of which similar response rates were obtained from the second, and correct statement, and fifth statement. A strong association is observed between the selection of the correct statement (highlighted in bold in table 4.6) and schools ( $p = 0.049$ ) and the regrouped groups of age ( $p = 0.047$ ) following Fisher's Exact testing. A modest, but insignificant correlation was observed between the original grouping of age and the selection of the correct statement ( $V = 0.255$ ,  $p = 0.076$ ) following Cramer's V testing.

Strong associations were identified following Fisher's Exact testing regarding the selection of the statement 'the fruit has not been stored' and the regrouped groupings of educational level and age ( $p = 0.012$  and  $p = 0.050$  respectively).

When prompted and unprompted responses were compared strong associations were observed between those who had correctly identified that a 'short time span was apparent between extracting the juice and its sale' and schools ( $p = 0.037$  following Fisher's Exact testing).

A significant association was observed between no similar themes appearing between qualitative and quantitative responses following Fisher's Exact testing and school attended ( $p = 0.035$ ). A modest yet significant correlation was also observed between perceived nutritional knowledge and the appearance of no similar themes ( $V = 0.288$ ,  $p = 0.005$ ) following Cramer's V testing.

#### *v. Added Vitamin C*

Numerous themes appeared when un-prompted to describe 'added vitamin C' (Figure 4.7) of which the majority of participants (81.5%) believed 'added vitamin C'

to simply mean that vitamin C had been added to the fruit juice. There were no significant associations between the selection of this statement and any variable.

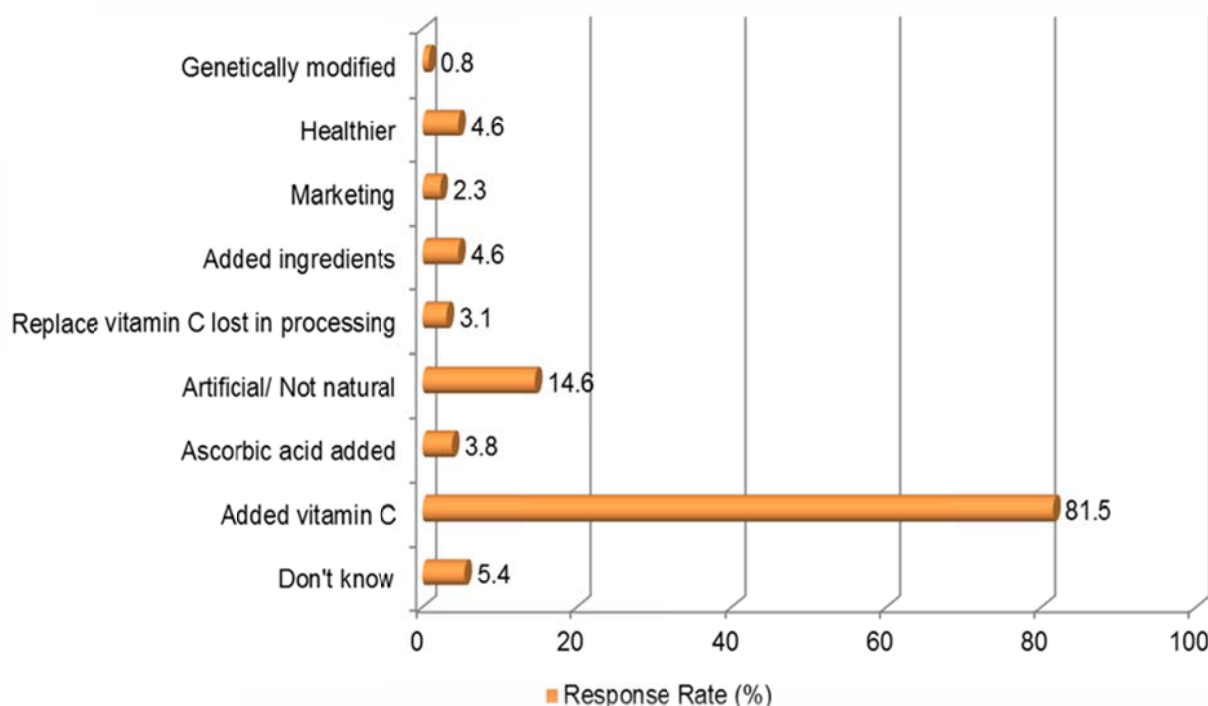


Figure 4.7: Response rates of participants for each theme identified to describe the term 'added vitamin C'.

There were no significant associations or correlations between correctly describing this term as meaning 'ascorbic acid added' with any of the variables both prior and post regrouping of age and educational level.

This form of juice was perceived as 'artificial' and 'not natural' by 14.6% of all participants, this was significantly associated with schools and re-grouped educational levels following Fisher's Exact testing ( $p = 0.024$  and  $0.045$  respectively).

This form of juice was also perceived as a form of 'marketing or conning' to increase sales, this had a significant but modest correlation with perceived nutritional knowledge ( $V = 0.247$ ,  $p = 0.019$  – Cramer's V testing).

A modest yet significant correlation was observed between gender and the belief this form of juice was 'healthier/ had health benefits' following Cramer's V testing ( $V = 0.209$ ,  $p = 0.017$ ).

Only a small percentage (5.4%) demonstrated a complete lack of understanding of the term by stating 'don't know', this wasn't correlated or associated with any variable.

As with the un-prompted answers, when prompted the majority of participants once again selected that 'vitamin C is added' to the fruit juice (67.7%) and not ascorbic acid (19.2%) which is correct (see Table 4.7).

Table 4.7: Response rates for each statement selected to describe the term 'added vitamin C'.

Statement	Response Rate (%)
'The fruit is genetically modified to contain more vitamin C'	10.8
<b>'Ascorbic acid is added to the juice during processing and packaging'</b>	19.2
'Vitamin C is added to the juice during processing and packaging'	67.7
'The juice contains less water and more oranges than other juices'	2.3

The selection of the statement 'added ascorbic acid' was correlated with the original groupings for level of education following the application of Cramer's V testing but they were not significant ( $V = 0.247$ ,  $p = 0.093$ ). Following the regrouping of the educational level categories, Fisher's exact testing demonstrated a significant association between the selection of this statement and educational level ( $p = 0.025$ ).

Perceived nutritional knowledge also resulted in a modest yet significant correlation with the selection of the correct statement ( $V = 0.255$ ,  $p = 0.014$ ) following Cramer's  $V$  testing.

There were no significant associations or correlations between those who didn't know what this term meant and any of variables.

No significant associations or correlations were observed between the selection of similar themes in both qualitative and quantitative responses.

#### 4.6 Correctly Identified Terminology

As can be seen from table 4.8, the majority of participants correctly identified one primary theme out of a possible five.

Table 4.8: The per cent response rate for the number of correctly identified primary themes for each school.

Number of correctly identified primary themes	School A (% response rate)	School B (% response rate)
0	26.3	31.4
1	42.1	45.7
2	26.3	17.1
3	3.2	2.9
4	1.5	2.9
5	0	0

A significant associations appeared as a result of Fisher's Exact testing between correctly identifying the theme 'water removed and added back' with the school recruited from and the regrouped categories of age ( $p = 0.047$  and  $p = 0.037$  respectively). Prior to the regrouping of educational levels a modest yet significant

correlation was observed with the identification of the theme that juice ‘not from concentrate’ was more pure or natural than juice ‘from concentrate’ ( $V = 0.343$  and  $p = 0.004$  – Cramer’s  $V$  testing). This correlation was lost following the regrouping of levels of education.

The term ‘from concentrate’ was correctly identified by 74 participants when prompted (56.9% response rate), this was the term that was correctly identified by the majority of the participants. Despite this relatively high result overall knowledge of orange juice terminology was deemed poor with the majority of participants only correctly identifying two correct statements i.e. average knowledge (see Figure 4.8).

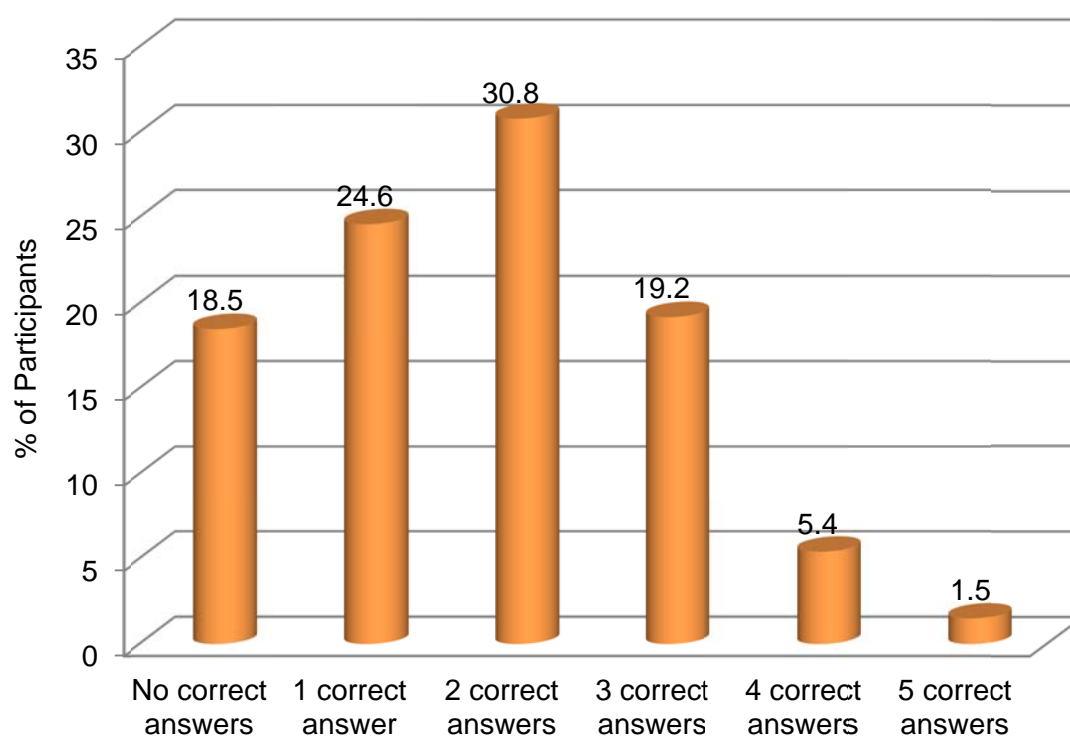


Figure 4.8: The percentage of participants who correctly identified different numbers of statements.

The two participants who correctly identified all five statements i.e. had excellent knowledge, were recruited from school A, none of the participants from school B correctly identified all five. As can be seen from Table 4.9 the per cent response rate correctly identifying said amount of statements varied between both schools



despite no significant associations or correlations being apparent between these two factors.

Table 4.9: The per cent response rate for the number of correctly identified statements for each school.

Number of correctly identified statements	School A (% response rate)	School B (% response rate)
0	15.8	25.7
1	23.2	28.6
2	29.5	34.3
3	23.2	8.6
4	6.3	2.9
5	2.1	0

Prior to regrouping there were no significant associations between level of education and the number of correct answers. Post regrouping, Cramer's V testing demonstrated a modest correlation between level of education and obtaining one correct answer ( $V = 0.315$ ) however this was not significant ( $p = 0.12$ ). Regrouping also resulted in significant associations between the level of education and obtaining zero, one and three correct answers ( $p = 0.044$ ,  $0.004$  and  $0.024$  respectively) following the application of Fisher's Exact tests.

Fisher's Exact test also demonstrated significance between the eligibility to receive free school dinners and obtaining two correct answers ( $p = 0.020$ ).

There were no significant associations or correlations between age and the number of correct answers both prior and post regrouping, gender and perceived nutritional knowledge. There were also no significant associations or correlations between the number of correct statements and purchasing other types of juice.

## 4.7 Importance of Orange Juice Labelling

When asked to select how often the participants pay reference to the labels on the orange juice they consume only 35.4% occasionally referred to the labels with more participants less likely to look at labels in comparison to those who do (42.4% vs. 22.3%) (see Figure 4.9).

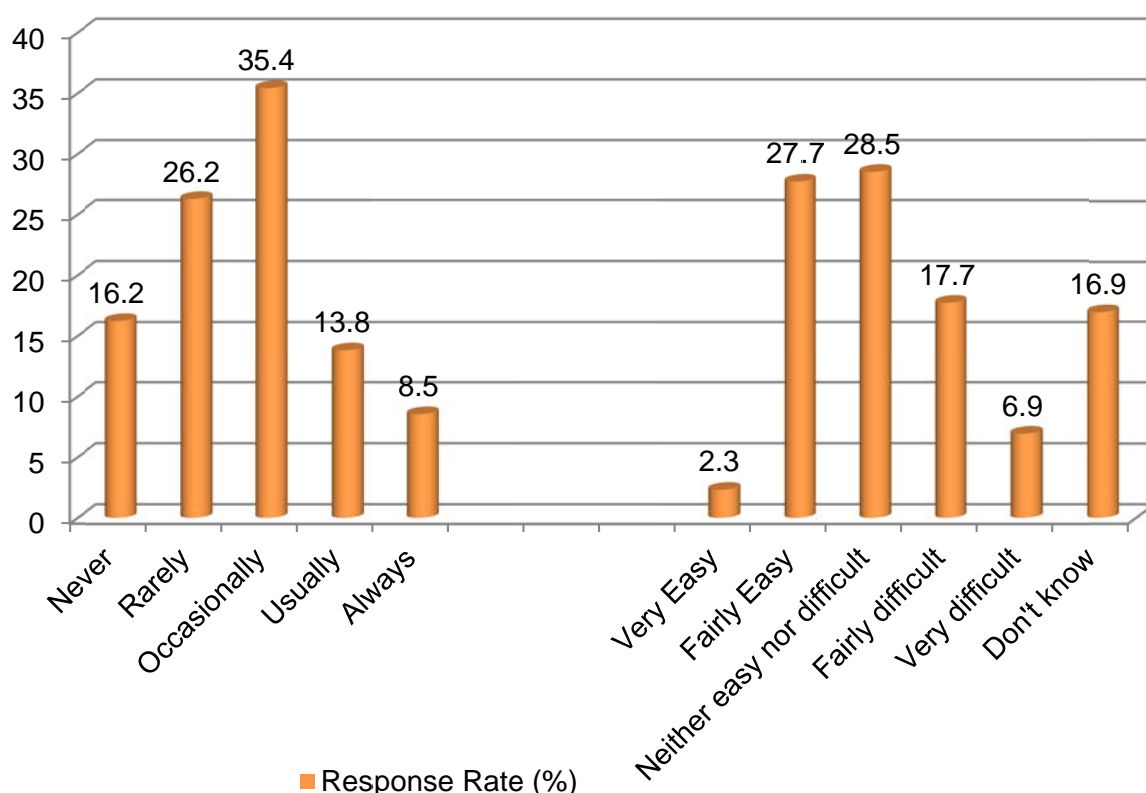


Figure 4.9: The number of participants who referred to FoP orange juice labels and how easy these labels were to understand respectively.

There were modest correlations between referring to labelling and perceived nutritional knowledge, eligibility to receive free school dinners and level of education (regrouped) following a Cramer's V test for correlations. However, it was only the correlations with perceived nutritional knowledge and eligibility to receive free school dinners which had significance ( $V = 0.254$ ,  $p = 0.032$  and  $V = 0.282$ ,  $p = 0.035$  respectively), the correlation with educational level was not significant ( $V = 0.259$ ,  $p = 0.068$ ).

A mixed response was observed when participants were asked to identify the ease of understanding the terminology used on the labels. Almost a quarter of participants believed the current labelling system was difficult to understand whilst a third found the system simple (see Figure 4.9).

As a whole the majority of participants scored above 5 for the importance of orange juice labelling. A modest yet insignificant correlation was observed between the importance of understanding the terminology and perceived nutritional knowledge ( $V = 0.307$ ,  $p = 0.078$ ).

55.4% of all participants agreed that the provision of more information would alter the type of orange juice purchased. Cramer's  $V$  analysis demonstrated a moderate but significant correlation between these factors and educational level prior to regrouping ( $V = 0.284$ ,  $p = 0.007$ ).

Qualitative data regarding how more information would alter consumer purchase resulted in thirteen key themes appearing, see Figure 4.10. 'Increased consumer knowledge' was one of the most recurring themes, which 19.2% of all participants mentioned. Many participants previously believed that they had understood the terminology used until specifically asked to describe the term in the questionnaire:

"Because filling in your form has made me realise I know very little."  
(Participant 31)

However there were no significant associations or correlations between 'increased knowledge' and any of the variables.

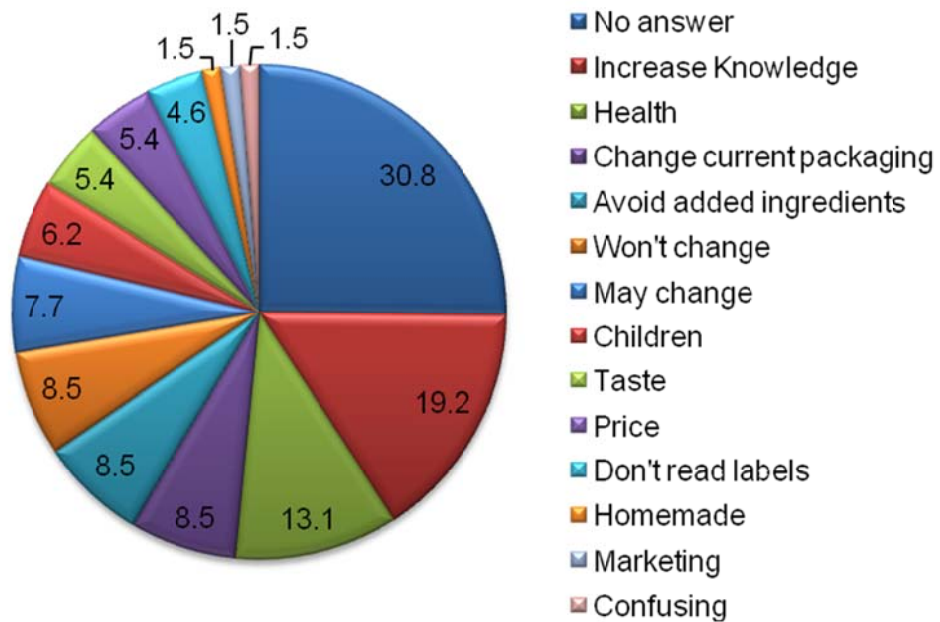


Figure 4.10: Percentage (%) response rate to each identified theme regarding how further information would alter the form of juice purchased.

Prior to regrouping of age categories there existed a modest but significant correlation between those who ‘wouldn’t change’ the juice they bought following the provision of more information and age ( $V = 0.250$ ,  $p = 0.048$ ) when Cramer’s V tests were conducted:

“We are habitual - if it works why change it?” (Participant 20)

Six of the participants (4.6%) stated that they ‘don’t read the labels’ for various reasons, of which there were modest but significant correlations with age both prior to regrouping of the age categories and schools ( $V = 0.310$ ,  $p = 0.006$  and  $V = 0.280$ ,  $p = 0.001$  respectively following Cramer’s V testing):

“I shop too quickly to read all the labels.” (Participant 66)

The themes identified displayed both positive and negative views which are associated with the use of labelling, these are summarised in Figure 4.11. For example, despite the majority of participants welcoming more information on the

labels to increase knowledge a small percentage also identified that this information could be misinterpreted:

“I wouldn’t necessarily trust the information or my interpretation.” (Participant 8)

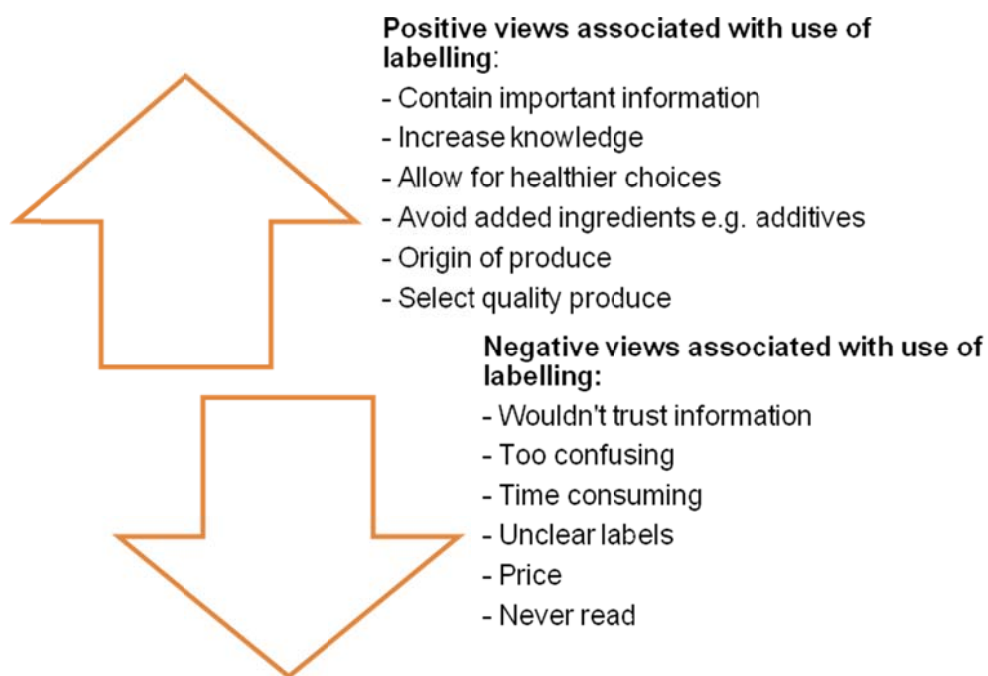


Figure 4.11: Summary of the positive and negative themes associated with orange juice labelling.

The majority of participants who discussed children in their answers also intercalated additional themes such as health, taste and avoidance of added ingredients. Ensuring the juice purchased was to the children’s taste was in some cases more important than any other factors:

“... Although I buy for taste and price primarily freshly squeezed is great but it is expensive and the children are not so keen on it. The cheaper juice is not as tasty so I end up buying Tesco own brand from concentrate. This does not contain juicy bits which the children do not like and it lasts longer than the chiller juices. I have never bought Sunny Delight as I checked the label and it was full of additives.” (Participant 11)

Cramer's V test demonstrated a modest but yet significant correlation between the combination of the themes of children and health and children and taste ( $V = 0.280$ ,  $p = 0.001$  and  $V = 0.223$ ,  $p = 0.011$  respectively). When cross-tabulating the responses from section 4.4 those respondents who selected the option that pressure from children affect the juice bought with those who mention children in response to gaining further information regarding the terminology used on FoP orange juice labels no associations or correlations were observed.

## **5.0 Discussion**

By addressing the key objectives and research questions of this study it has been possible to develop an understanding of the reasons behind consumers choice in their selection of orange juice in terms of how they both use and understand FoP orange juice labelling systems. As a result of this understanding it is possible to determine what consumers require of the information provided on such juices. In turn, this may enable producers and health professionals to better convey the information consumers require to ensure that individuals know what they are buying.

### **5.1 Research Questions**

1. What is the level of understanding of parents of school children in relation to labelling of orange juice?

Participant understanding of the terminology used on FoP orange juice labels was deemed poor with the majority of participants only correctly selecting two statements when prompted. Unprompted responses provided a variety of themes, with the majority of participants correctly identifying one term. These results confirm results obtained from the previous study in the subject area which found that knowledge of orange juice labelling in a general sample of the population was poor (FSA, 2002).

2. Does SES, level of education, age, perceived nutritional knowledge and gender affect knowledge of orange juice labelling?

The level of education, perceived nutritional knowledge and the school the participant was recruited from did demonstrate significant associations or correlations in terms of correctly describing or identifying the correct statement for certain types of juices however these weren't universal.

### 3. Which factors contribute to purchasing behaviour?

The principal factor which influenced purchasing behaviour was price; this was closely followed by quality and nutritional value. Price may have resulted in participants purchasing a juice type which they don't deem as the healthiest type as the juice selected may have been cheaper than that which is perceived healthier.

## **5.2 What is Purchased Versus What is Perceived Healthiest.**

Section 4.4 has previously demonstrated a significant difference in the type of juice bought by the participants and what they deem is healthiest (see Figure 4.2); with the majority of participants purchasing juice 'from concentrate' but believing that 'freshly squeezed juice' is the healthiest form. There may be a number of reasons for this, such as additional pressures reducing the value of selecting the healthiest option (Maubach, et al., 2009). As no previous research has been conducted within this specific subject area it is not known if these results are true for the population of the UK as a whole.

Results from the NDNS demonstrate high consumption rates of fruit juice, in particular in children aged between 4 and 10 years of age (Bates et al., 2010); this has also been observed in National Food Surveys conducted by the Department for Environment, Food and Rural Affairs (Defra). In Wales the average consumption rate for fruit juice was 264ml/person/week, this rises to 313ml/person/week in England (Defra, 2000). When the high consumption rates of fruit is combined with the increased costs of food, in particular nutrient dense food (Monsivais, Mclain, & Drewnowski, 2010) it is clear that in the current economic climate cost will greatly impact the selection of juice bought. In recent years it has been shown that sales of fruit juice have declined by a 3.1% fall in volume (BSDA, 2010). This may suggest that the BSDAs aim to cut value added tax (VAT) on fruit juice and smoothies (the only forms of fruit which are taxed) would be beneficial in order to promote fruit juice



sales and may increase the number individuals who consume 5 portions of fruits and vegetables each day (BSDA, 2008).

Despite the questionnaire asking how frequently orange juice is purchased in the household, the questionnaire doesn't establish how frequently orange juice is consumed. However, it has previously been reported that increased accessibility and availability of fruit juice increases the consumption of juice (Pearson, Biddle, & Gorely, 2009) with fruit juice contributing towards a quarter of daily fruit intake (Nicklas, O'Neil, & Kleinman, 2008; Storey, Forshee, & Anderson, 2006). Data from current NDNS however demonstrate that boys and girls aged 4-10 years achieve 57.0% and 41.1% respectively of their daily fruit intake from fruit juice (Bates, et al., 2010). Results from the study demonstrate that the majority of participants purchase juice once to twice a week (40.8%), which may indicate that consumption rates of fruit is high, however the questionnaire doesn't establish how much juice is purchased.

High consumption rates of fruit juice may occur as a result of food preferences from children in terms of taste and food neophobia also alter the food consumed within the home (Galloway, Lee, & Birch, 2003). Fruits and vegetables are poorly consumed by the majority of children within the UK (Edwards, & Hartwell, 2002; Galloway, Lee, & Birch, 2003), this may lead to children drinking higher amounts of fruit juice in order to achieve adequate nutritional intake, despite fruit juice only accounting for one portion of fruit per day.

Price was a common factor which influenced the selection of orange juice (see Table 4.2 in section 4.4), this is an important factor when analysing participant selection of orange juice during the economic recession as nutrient dense foodstuffs, such as orange juice, are costly (Darmon, Ferguson, & Briend, 2006).

However, limitations in this questionnaire have resulted in the inability to examine whether price was important in terms of being more or less expensive and only as the general theme of price was obtained through quantitative data. However, qualitative responses in terms of price demonstrated a tendency towards lower prices being more important than selecting juices which are more expensive. These responses paid particular attention to the current economic status affecting purchasing selection.

Despite only half of the participants from each school considering the effect of food transportation on the environment, consideration on how food transportation will directly affect the cost of the orange juice sold within the UK should be examined. This occurs as a result of increased fuel charges and taxes which in turn will increase the price of foodstuffs (Pretty et al., 2005). The effect of food transportation on the price of foodstuffs was not covered within the scope of the questionnaire; further research may be required to determine if those who are concerned about purchasing low priced food consider the economic cost of food miles.

The climate impact of juice 'not from concentrate' was almost three times higher than juice 'from concentrate', that is more greenhouse gasses are released in the production and transportation of juice 'not from concentrate' (Smedman, Lindmark-Månsson, Drewnowski, & Edman, 2010). One of the reasons that this form of juice has a greater impact on the environment is due to the fact it requires a larger transportation volume which will in turn increase the cost of transporting the juice and therefore increase its sale price (Wilmsmeier, & Sanchez, 2009). Consumers may be purchasing juice 'from concentrate' as this is a cheaper alternative to other forms of juice.

As a result of the economic climate, sales of supermarket own brands have increased, in particular sales of 'value' brands, as the average consumer views this as a means to reduce the cost of their weekly shopping without affecting the content of the shopping basket. Not only is this beneficial for the consumer but it also results in the supermarket being viewed in a positive light in assisting the general population through the difficult economic climate (Roberts, 2010). The majority of participants from school B, that of higher IMD, did purchase stores own branded juice, which correlates with the theory that those from areas of high IMD or low SES spend less on foodstuffs (Darmon, & Drewnowski, 2008).

Past studies have demonstrated that pressure from children plays a significant role in the selection of foodstuffs. These studies have demonstrated that children's food preferences are influenced by advertisers who positively advertise foodstuffs to shape children's relationship with foodstuffs and brand loyalty (Jones, Mannino, & Green, 2010). Developing a strong brand is the most important strategy of any business in order to build customer loyalty and therefore increase sales (Lee, Gao, & Brown, 2010).

Pressure from children however was not a major factor which impacted the selection of juice bought perhaps as fruit juice isn't as heavily marketed towards children. The one exception to this is 'Sunny D' (previously 'Sunny Delight') which is marketed towards children as a healthy orange juice but is in fact made of 9% added sugar, preservatives, food colourings and flavourings (Much, & Erickson, 2008). However, when this form of juice was mentioned in qualitative data none of the parents stated that they purchased this form of juice. This may be as a result of parents only wishing to buy juice of nutritional quality for their children or as a result of social desirability as this form of juice is not perceived to be healthy.

However, brand loyalty is not only achieved by advertisement, product packaging plays a key role in gaining loyalty. For example, following the package redesign of one of the biggest global orange juice brands sales fell and did not increase until the packaging returned to its original style. The changes which occurred were not major changes, simply the recolouring of certain aspects of the packaging such as lid colour and the shade of orange. However, these small changes cost the firm a \$27.3 million loss in sales in a matter of months as consumers couldn't recognize their preferred type of juice and thought the redesign made the product look 'cheap' and not 'eye-catching' enough (Lee, Gao, & Brown, 2010).

Certain results from this study however demonstrated a need for a change in current FoP packaging, these included more information regarding where the oranges were grown and information regarding the addition of ingredients such as additives, preservatives and sugars. If manufacturers were to redesign their packaging to address to the demands of the consumer this should be done following thorough market research in order to gain an in-depth understanding of consumer preferences (Javalgi, Martin, & Young, 2006). This is essential in order to develop a packaging which would satisfy the customer and ensure that product sales aren't decreased as a result of these modifications.

One example of where consideration of the redesign of packaging is needed is regarding the addition of certain ingredients as some participants wanted to avoid any chemicals which are added to the juice they consume. Despite this only a small per cent of participants purchased 'freshly squeezed' or 'pure' juice, the two juices which the majority of participants believed contained fewer or no added ingredients. As these are the juices don't contain added ingredients it would be beneficial for the manufacturer spending money redesigning packaging to advertise the lack of added

ingredients if consumers already believe this is true, or do consumers require this information to be visually displayed on packaging to encourage their purchase?

### **5.3 Misunderstanding of FoP Orange Juice Terminology**

Half of the UK population now consumes fruit juice (Caswell, 2009) however understanding of the terminology used on FoP orange juice labelling was poor in all groups despite the average score for the importance of the information displayed on FoP orange juice labels being 7.1 out of 10. These poor levels of understanding reflect the results which were also obtained from a previous study (FSA, 2002). However the previous study only compared the knowledge of terminology of the whole sample and not in terms of gender, age, SES, educational level and IMD as in this study.

Past studies investigating the usability of FoP labelling of foodstuffs have found varying degrees of evidence which indicate that individuals from certain demographics find the information provided on FoP confusing and difficult to use (Feunekes, et al., 2008). Those demographics who may find FoP more difficult to use and understand than others can include those of low SES or high IMD and those with lower levels of education. Determining why these groups have a lower use and understanding is key in order to develop effective FoP labelling for the UK population as a whole. For example, is this lack of usability due to lower nutritional knowledge or is it as a result of a disinterest in healthy eating or are other multiple factors involved (Grunert, Wills, & Fernández-Celemin, 2010).

When prompted the term which the majority of participants correctly identified was juice 'from concentrate', however it was 'pure juice' that was correctly identified by the majority of participants when un-prompted. 'Added vitamin C' was the term which the majority of participants incorrectly identified both when prompted and un-

prompted with the vast majority of participants failing to identify that it was the synthetic form of vitamin C, known as ascorbic acid, and not its natural form which is added to orange juice to form juice with 'added vitamin C'. Ascorbic acid is identical to natural vitamin C and has the same nutritional benefits is added to orange juice in order to replace the natural vitamin C which is lost during processing and to compensate for seasonal or natural variations of nutrient levels (Richardson, 1997).

Those individuals who correctly identified all five correct statements were recruited from schools A, that is from the school of low IMD. It has been previously hypothesised that those of higher social grade may have a higher degree of interest in healthy eating and therefore greater nutritional knowledge as well as higher levels of education and intellectual ability (Grunert, et al., 2010).

However, the participants who correctly identified all five statements didn't necessarily meet these criteria. For example, only one of these participants believed they were very knowledgeable in nutrition, the other stated their knowledge was average. Also, the participant who believed their nutritional knowledge was high was educated to a lower level than the participants who believed their nutritional knowledge was average.

Surprisingly, despite both individuals stating they wouldn't change the type of juice bought in the light of further information being provided on the orange juice labels neither participant purchased the juice they perceived to be healthiest. No reason was given for this unwillingness to change but may have occurred as a result of individuals becoming habitual and becoming dependent on past purchases (Grunert, et al., 2010). For example, one of these participants only rarely looked at

the labels of orange juice which may indicate habitual tendencies as they only buy a certain form of juice.

Studies have shown that individuals who use FoP food labels on a regular basis have a greater understanding of FoP food labels than individuals who don't (Cowburn, & Stockley, 2005; Grunert, et al., 2010). Results from this study also demonstrated that those who found the FoP labelling of orange juice easy to understand would usually or always look at the label whereas those who found the labelling fairly or very difficult to understand also never or rarely looking at the labels. The former sub-group had an increased rate in correctly identifying a higher number of statements than the latter.

In order to increase the number of consumers who understand the terminology used on the orange juice they select, manufacturers and retailers need to provide more information in lay terms in order to increase consumer knowledge. This can be achieved by altering current packaging to become user friendly and more attractive which may result in increased consumer knowledge of the terminology used (Nørgaard, & Brunsø, 2009).

#### **5.4 Answering the Hypothesis**

This study hypothesised that knowledge of FoP labelling of orange juice wouldn't be affected by SES, IMD of the school or level of education.

In this study SES and IMD was determined in relation to the school the participant was recruited from and the eligibility to receive free school dinners, but can also be measured in terms of educational level (Darmon, et al., 2006). For all three categories those of higher SES correctly identified a slightly higher number of terms than those of lower SES, which strengthens previous studies that those of higher

SES have a higher understanding of FoP labelling of foodstuffs (Garrett, 2007). However, as the number of correctly identified terminologies was low in both schools those of higher SES standing or lower IMD don't possess a universally significantly greater knowledge than participants of lower SES.

When analysing the level of education as an individual factor and not in terms of SES, the same results were observed once again. That is those with a higher level of education correctly identified a higher number of statements than those with a lower level of education. This corresponds to past studies which demonstrate that individuals with increased levels of educations demonstrate a better understanding and use of nutritional labelling of foodstuffs (Garret, 2007). However, as the number of correctly identified terms were still low this relationship was not universally significant.

The study correctly hypothesised that those with higher levels of education and those of higher SES or lower IMD demonstrated a greater understanding of the terminology used on orange juice labelling. However, as the number of correctly identified statements was not high in any group knowledge and understanding of FoP orange juice labels was concluded as poor.

### **5.5 Limitations**

In addition to the limitations listed within the findings of the study the following limitations must also be considered.

Despite inviting 320 families to take part in the research, only 130 (95 from school A and 35 from school B) responded and were used in the study. Those who didn't respond may reduce the effectiveness of the sample size, of which only 130 out of the required 137 were recruited, which may introduce sample bias (Edwards, et al.,



2009). Bias can exist in studies for a number of reasons such as interest level in the topic of research. No cash incentive was offered to those who completed the questionnaires, however those who did complete the questionnaires were provided with an information sheet (Appendix IV) which provided detailed explanations of the terminology used on FoP orange juice labelling.

Table 4.1 in section 4.2 summarises the participant characteristics of the usable sample obtained. Key factors to consider from these response rates which may reduce the generalisation of the results include:

- There was a 36.8% increase in the response rate from school A in comparison to school B which has resulted in the under representation of those living on areas of low IMD.
- The majority of respondents from both schools were female (78.9% from school A and 77.1% from school B) which has resulted in the views and understanding of males being under represented.
- Distribution of highest level of education was unequal within each school and between both schools which has resulted in the under representation of certain groups in terms of educational level.

The questionnaire also asks for participants to state their perceived level of nutritional knowledge. This is subject to self-reporting and it may not always be accurate as participants may be swayed by what they believe the researcher wants to hear, perceived comparison with peers and social desirability bias (Palmer, Graham, Taylor, & Tatterson, 2002). This could have been overcome by including a short section at the start of the questionnaire to assess nutritional knowledge through specifically designed questions (Petrovici, & Ritson, 2006). However, as shorter questionnaires are deemed more successful and more likely to achieve

higher response rates (Boynton, & Greenhalgh, 2004) this section wasn't included in the questionnaire.

Despite the questionnaire not specifically asking if participants believed that orange juice with 'added vitamin C' was the healthiest option, there was space provided for participants to state this option if they believed this was true. Despite this limitation in terms of quantitative data, certain qualitative responses did lead to the suggestion that a small number of participants believed that the addition of vitamin C is beneficial for health.

As both schools were located within the same community, results obtained may not represent the national population. Personal communication with both headmistresses reported that all of their pupils were of white British ethnicity. This was of no surprise as the majority of individuals living in Wales who were not of white British ethnicity lived in the cities of Cardiff, Newport and Swansea, all of which are in South Wales whereas the study was conducted in North Wales. The Welsh population has an estimated 4% of non-white British citizens (Office for National Statistics, 2001a), with only 0.2-0.9% of the population of Flintshire being classed as non-white citizens in 2001. As a whole only 2% of non-white citizens living within the UK live within Wales whereas 95% reside in England, 2% in Scotland and 1% in Northern Ireland with half living within London (Office for National Statistics, 2001b). This has resulted in limited participant sampling of which certain population sub-groups were not included within the study.

Also despite aiming to recruit schools of varying levels of deprivation both schools were recruited from an area of low deprivation (Welsh Assembly Government, 2008). This results in the population group not being fully representative of all levels of deprivation within the UK.

These limitations resulted in the population selected for the study not being a representative sample of the UK which will reduce the generalisation of the results and reduce the external validity of the results.

### **5.6 Implications of the Research**

The study has re-assessed the knowledge of consumers regarding the terminology used on FoP orange juice labels. Since the original study was conducted (FSA, 2002) the government has released guidelines to increase consumer understanding of the current labelling formats of all foodstuffs and to form clear and straightforward labels (DoH, 2004). However, results from this study demonstrate no significant increase in the consumer knowledge with regards to the understanding of orange juice labelling.

Many participants stated they would opt to avoid added ingredients which they perceive as artificial such as additives, preservatives and sugars. However, only a few stated that 'added vitamin C' was artificial with higher response rates believing this form of juice provided additional health benefits. This demonstrates the need to correct messages which are ambiguous and strengthening messages which will have a positive impact (Sun, Shen, & Pan, 2008). In terms of 'added vitamin C' consumer should be made aware that it is in fact chemically identical synthetic vitamin C, ascorbic acid, with is added, but that this still provides the majority of health benefits of natural vitamin C (Meléndez-Martínez, Vicario, & Heredia, 2007).

An important issue to address is that of the subjective understanding the consumer places on information detailed on labels. This involves ensuring that what the consumer perceives to have understood from labels is compatible with the

information the manufacturer of the label intended to communicate (Grunert, & Wills, 2007). This study has demonstrated that the number of participants who believed they understood the terminology didn't correspond to the number who correctly identified all five statements. This demonstrates that either the intended messages from the manufacturer are not reaching the consumer, or that current labelling systems are unclear and misleading (FSA, 2010).

It has previously been stated that the government and the commercial industry have recognised and acknowledged that consumers need to be empowered in terms of selecting foods to promote health (Garrett, 2007). However, it is clear from participant responses to this study that this aim still remains to be achieved in terms of the terminology used on orange juice labelling. Not only was knowledge deemed poor of the terminology used, many would opt to change the type of juice they purchased in the light of further information being provided.

Despite FoP labelling being designed to encourage healthier choices the results of this study state that the majority of consumers don't read the information provided on orange juice labels. Instead consumers are more influenced by factors such as price and taste and not the information presented on the labels (Garret, 2007). Understanding the barriers as to why consumers don't always read orange juice labelling is essential in order to discover how to best display the information required and needed on orange juice labels. However, the majority of participants stated that further information would alter the form of juice purchased as a result of increased consumer knowledge.

## **6.0 Conclusion**

Results from this study conclude that current knowledge regarding the understanding of the terminology used on FoP orange juice labels is poor across all demographic groups sampled within the study. Previous attempts to improve use and understanding of FoP labelling have been implemented in order to bridge the gap between individuals of different demographic subgroups as certain subgroups have been shown to have a better understanding and therefore increased use of these labels.

However, as there were no significant differences between the demographics, previous approaches to increase understanding of FoP foodstuffs labelling would not be advantageous in relation to increasing consumer knowledge and understanding of orange juice labelling. In order to increase consumer understanding the wording used on FoP orange juice labels needs to be simplified in order to increase consumer understanding which would allow for more informed decisions to be made in relation to the selection of orange juice.

### **6.1 Recommendations**

Conclusions from this study indicate that the vast majority of those purchasing orange juice are confused regarding the terminology used on FoP labelling. As mentioned above, just simplifying the wording used on FoP orange juice labels would be an effective way to increase consumer knowledge and understanding of the various forms of orange juice available for purchase.

If further market research discovers that changing the terminology would reduce sales for various reasons or negatively impact consumer perception of the juice, other methods may be employed to increase understanding. For example, providing clear and simple information regarding the processing behind each form of juice,

either on the label, on an information sheet or on the stands where the juices are sold. However, further market research is required in order to develop the most appropriate manner of doing this and to ensure that the language and wording employed are understood by all.

This study has proven that as well as knowledge being poor, not all consumers read FoP labels due to confusion regarding terminology and mistrust of marketing campaigns. Further guidelines are required to ensure the consistency of the terminology used on FoP orange juice labels. For example, legislating the terms 'freshly squeezed' and 'pure juice' would also be advantageous to ensure that all companies follow the same guidelines when producing these drinks. If the labels were to be changed in order to simplify current terminology it would be essential to legislate these in order to ensure consistency and reduce consumer confusion. Ensuring that all terms are regulated may alleviate some of the trust issues which arise regarding the use of these terms. However, in order to alter current legislations regarding food labelling

## **6.2 Recommendations for further study**

In order to investigate if simplifying the terminology used on FoP orange juice would increase consumer knowledge further market research is required. This would involve producing a variety of labels all of which describe the specific form of juice in layman terms. A variety of labels will be required for each juice in order to determine which is most understood by the majority of consumers.

It may also be useful to determine if providing information on current labelling formats would benefit the consumer or if the information would go unused. If this information was to go unused it would show result that simplifying the current

terminology would be the most effective way to increase consumer knowledge and understanding.

In order to increase the external validity and generalisation of the results obtained from further studies a broader sample of the population will be required. This may entail an increased sample size and the inclusion of additional demographics, such as ethnicity, in addition to increasing the number of participants within each demographic area to improve the reliability and specificity of the results obtained.

Focus groups will be required in order to enhance the quality of qualitative data obtained in order to gain further in-depth opinion regarding the usage and understanding of the terminology on orange juice labelling if current formatting were to change.

Taste and price were commonly mentioned within the results, these themes could be investigated further by:

- Conducting a taste test – Providing participants with small samples of all forms of juice and asking the participant to identify the juice through the selection of the correct terminology.
- The study could be repeated again once the country is out of the economic recession as this may lead to the identification of other factors which are important when selecting the orange juice consumed.

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### Appendix I - Justification of question choice in the questionnaire

Question Number	Section	Reference	Why use this/these questions?	Literature
1-6	General	Murphy, M. (2007). <i>Parents' use and understanding of front-of-pack food labelling, and the impact of socioeconomic status</i> . Unpublished master's thesis, University of Chester.	These 6 questions are required in order to evaluate the data and will be used as a means to assess knowledge and how knowledge will differ dependent on socioeconomic status, age and gender. Nutritional knowledge will also be adjusted for and any participant working in the field of nutrition or dietetics will be excluded from the study.	Socioeconomic status as been shown to influence various lifestyle factors including the food choice selections. For example those from lower socioeconomic groups commonly buy food of lower nutritional quality than those from a higher economic status (Drewnowski, Monsivais, Maillot & Darmon, 2007).
7-10	Food Shopping	Murphy, M. 2007.	In order to determine and assess general shopping habits questions 10-	In today's developed world many factors influence the food choices we make, from where we shop to who we

	Habits		13 have been included in the questionnaire.	shop with (Park et al., 1989). How often we shop affects where we shop and the time duration of these visits and shopping with others have been shown to alter selection of foodstuffs (Clarke & Banga, 2010).
11	Food Shopping Habits	None	A vast amount of foodstuffs in the UK are imported which is why the questionnaire has addressed this issue in order to determine consumer concern.	The transportation of foodstuffs from its site of production to the end-consumer is known as food miles and is one of the biggest contributors to pollution in the UK (Defra, 2005) which will increase the amount of greenhouse gasses released to the environment leading to global warming (Pretty et al., 2005).
12-14, 16, 18-19	Orange Juice Buying Behaviour	None	These questions have been designed to obtain a detailed overview regarding the purchasing patterns associated specifically to orange juice and will measure frequency of purchase, orange juice selection preference and	As previously mentioned many factors contribute towards purchase selection. However, current literature does not address issues specifically regarding orange juice buying behaviour which is why these questions have been included to expand on previous knowledge.

			consumption of other juices.	
15-17	Orange Juice Buying Behaviour	FSA, 2002	These questions aim to examine the major factors which contribute to selection choice in relation to individual preference and the identification of influencing factors.	THE FSA study in 2002 did target the effect of branding on purchase choice of orange juice which is why these questions have been included in order to determine the effect if being will influence consumers to purchase this product over non-branded items which are thought to be of lower nutritional value (Darmon et al., 2009).
20-29	Knowledge of Orange Juice Terminology	FSA, 2002	These questions have been designed to evaluate knowledge of orange juice labelling, when unprompted and prompted with a selection of statements.	The FSA 2002 study discovered a vast number of participants did not fully understand the terminology used on labelling of orange juice and their perception of what they deemed the term to mean changed in response to un-prompted and prompted questions.
30-33	Knowledge of Orange Juice Terminology	FSA, 2002	In order to evaluate consumer perception regarding orange juice labelling these questions have been included to determine how customers	Participants in the FSA 2002 study rarely referred to fruit juice labels however stated that the information provided on the labels was of importance, which is a contradiction. Participants of the study also stated that the terminology

			rate the importance and understanding of terms used on orange juice labels.	used on fruit juice labels was easy to understand, however most participant failed to correctly identify the correct definition for the terminology used.
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## Appendix II - Permission letters obtained from both schools

Ysgol Glanrafon  
Lôn Bryn Coch  
Yr Wyddgrug  
Sir Y Fflint  
CH7 1PS  
Ffôn 01352 700384  
Ffacs 01352 700384  
E-bost glmail@Ysgol-Glanrafon.Flintshire.Gov.UK



**Ysgol Gymraeg Glanrafon**

Miss Ll. M. Jones BAdd  
Pennaeth Headteacher

Ysgol Glanrafon  
Bryn Coch Lane  
Mold  
Flintshire  
CH7 1PS  
Tel 01352 700384  
Fax 01352 700384  
E-mail glmail@Ysgol-Glanrafon.Flintshire.Gov.UK

22 - 4 - 10

To whom it may concern,  
I give full permission for  
Sian Esther Giddins to share a questionnaire amongst  
the parents of this school as part of her  
research work at Chester University.

Yours sincerely,  
Leinae Mary Jones (Miss)  
(Headmistress).





Pennaeth - Headteacher  
Mrs Margaret Lonsdale  
NPQH D.A.S.E Adv. Dip SM. Cert Ed.

Ysgol Gynradd Bryn Gwalia  
Bryn Gwalia County Primary  
Ffordd Clayton Clayton Road  
Yr Wyddgrug Mold  
Sir Fflint Flintshire  
CH7 1SU  
Ffon: Phone: 01352 752659  
e-bost: e-mail:  
gwmail@bryn-gwalia-cp.flintshire.gov.uk  
www.bryngwalia.flintshire.sch.uk



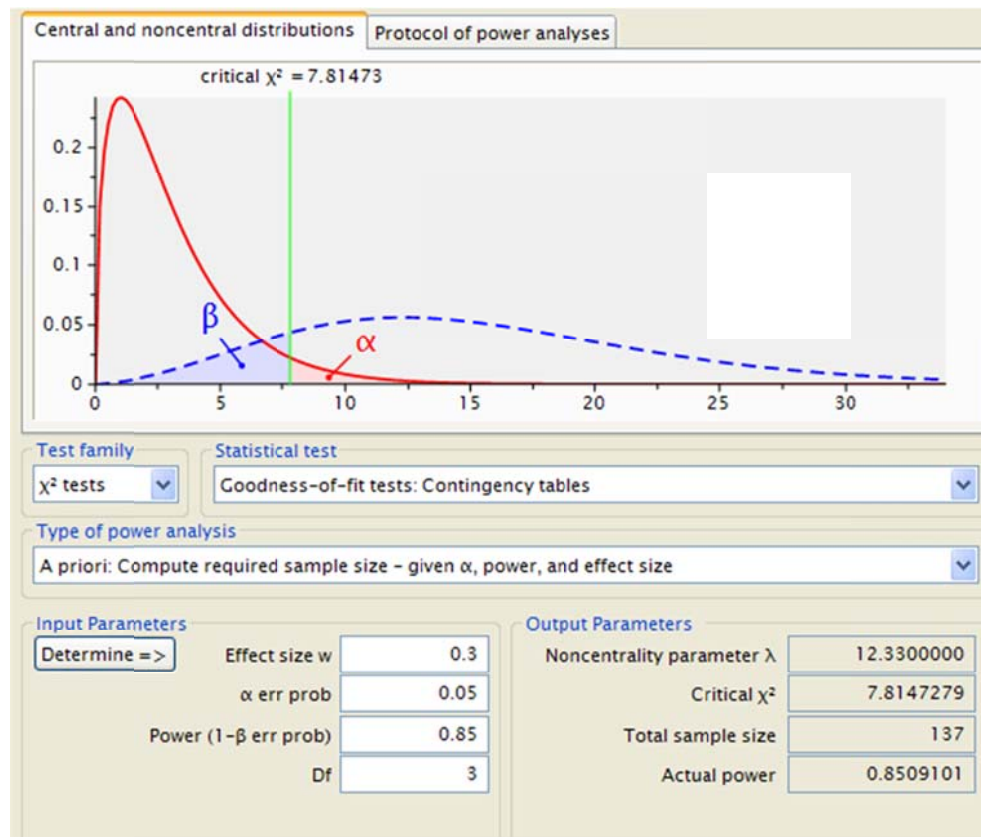
I give permission for Ysgol Bryn Gwalia to be used as a survey school.

*M Lonsdale*

M Lonsdale  
Head teacher



### Appendix III - Sample size calculation



## Appendix IV – Information Pack



Sian Giddins  
c/o Alison Morgan  
Thomas Building  
University of Chester  
Parkgate Road  
Chester  
CH1 4BJ  
DATE

Dear Parent/ Guardian

### Orange Juice Research

I am currently studying for a master's in Public Health Nutrition at the University of Chester and am conducting some research to discover if parents / guardians fully understand the terms used on the labels of orange juice packaging. I am hoping to recruit the parents / guardians at (Selected School) in order to assist me in my research.

Attached, you will find a Participant Information Sheets, Consent Form and an Orange Juice Research Questionnaire. The Participant Information Sheet provides you with the details as to why I am conducting this study, your involvement and who to contact regarding any queries. In order to be able to use the completed questionnaires it is required that each participant signs the Consent Form.

The Orange Juice Research Questionnaire is provided for you to complete if you decide you wish to take part, you are under no obligation to take part in this study. Completed questionnaires should be returned to the school by DATE. All that I ask is that **main food purchaser in the household** completes the questionnaire.

The study is being carried out under the supervision of the University of Chester.

If any questions regarding the study arise please feel free to contact myself, through the medium of Welsh or English, or my supervisor, through the medium of English only, with the details provided on the Participant Information Sheets. I look forward to hearing from you.

Yours sincerely,

Sian Giddins  
Student at the University of Chester

c/o Alison Morgan – 01244 513090





Sian Giddins  
c/o Alison Morgan  
Thomas Building  
University of Chester  
Parkgate Road  
Chester  
CH1 4BJ  
DATE

Annwyl Rhiant / Gwarchodwr

### Ymchwil Sudd Oren

Rwyf yn astudio am radd meistr mewn Maethiad Iechyd Cyhoeddus ym Mhrifysgol Caer ac yn ymchwilio i ddealltwriaeth rhieni / gwarchodwyr o'r termau sy'n cael eu defnyddio ar labeli sudd oren. Rwy'n gobeithio holi rheini / gwarchodwyr disgyblion (ysgol a ddewiswyd).

Ynghlwm â'r llythyr yma mae Taflen Wybodaeth, Ffurflen Caniatâd a Holiadur Ymchwil Sudd Oren. Mae'r Daflen Wybodaeth yn darparu gwybodaeth ynglŷn â pham rwy'n cynnal yr ymchwil, eich rôl chi a phwy i gysylltu ag o os yr ydych angen mwy o wybodaeth. Mae angen i'r unigolyn sy'n cwblhau'r holiadur arwyddo'r Ffurflen Caniatâd.

Os ydych yn dymuno cymryd rhan yn yr ymchwil cwblhewch yr Holiadur Ymchwil Sudd Oren. Gofynnir i'r holiaduron sydd wedi ei cwblhau gael eu dychwelyd i'r ysgol erbyn DYDDIAD. Gofynnaf mai dim ond yr **unigolyn sydd yn gwneud y rhan fwyaf o'r siopa bwyd** ddylai gwblhau'r holiadur.

Mae'r ymchwil yn cael ei gynnal o dan arolygiad Prifysgol Gaer.

Am fwy o wybodaeth ynglŷn â'r ymchwil mae croeso i chi gysylltu â mi drwy'r Gymaraeg neu Saesneg, neu drwy Saesneg yn unig gyda fy arolygydd. Gweler y Daflen Wybodaeth am fwy o wybodaeth. Edrychaf ymlaen i glywed gennych.

Yn gywir

Sian Giddins  
Myfyrwraig ym Mhrifysgol Gaer

c/o Alison Morgan – 01244 513090



**PARTICIPANT INFORMATION SHEET**  
**Parents' understanding of front of pack orange juice labelling**

My name is Sian Giddins and I am a student at the University of Chester. I am carrying out a research project and would like to invite you to take part. Before you decide to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish. Feel free to contact myself if there is anything that is not clear or if you would like more information.

Here are some questions you may want to consider.

**What is the purpose of the study?**

My study is aimed at discovering parents understanding of front of pack orange juice labelling. I wish to investigate if parents understand the words which are used in labelling, such as from concentrate, and the factors which effect the selection and purchase of orange juice.

**Why have I been chosen?**

As children have drink high amounts of fruit juice in comparison to adults I have chosen to research the knowledge of parents of young children regarding the wording used on orange juice labels as it is the parents who are usually responsible for purchasing the juice.

**Do I have to take part?**

You are under no obligation to participate in the research. If you decide to take part you will be given this information sheet to keep. If you decide to take part you are still free to withdraw at any time and without giving a reason. However, as questionnaire results will remain anonymous once the questionnaire is submitted it cannot be withdrawn.

**What will happen to me if I take part?**

If you decide to take part, you will be required to complete the questionnaire attached to this information sheet. The questionnaire can be completed at home and should not take more than half an hour of your time. All that I ask is that the person who carries out most of the household shopping completes the questionnaire, preferably alone to obtain the knowledge of that individual. If you do not fully understand the questionnaire you may ask friends or family to clarify the matter or contact myself.

The completed questionnaire must be placed within the envelope provided, sealed and returned to school, either by yourself, your child or post. I would be grateful if all completed questionnaire could be handed in by DATE.

**What are the possible disadvantages and risks of taking part?**

There are no disadvantages or risks foreseen in taking part in the study as you will not be exposed to harm, hazards or distress.

**What are the possible benefits of taking part?**

You may gain further knowledge regarding labelling of orange juice which may help you to make healthier choices when shopping in the future.

**What if something goes wrong?**

If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact: Professor Sarah Andrew, Dean of the Faculty of Applied and Health Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ. Tel: 01244 513055.

**Will my taking part in the study be kept confidential?**

All information which is collected about you during the course of the research will be kept strictly confidential so that only the researcher and the research supervisors will have access to such information. No names shall be used in writing up the study and all data will be stored securely and made anonymous in the report.

**What will happen to the results of the research study?**

Your answers will be used as data in my research alone which will then be written up into a report and kept at the University of Chester Library. Individuals who participate will not be identified in any subsequent report or publication.

**Who is organising and funding the research?**

I am carrying out this research on behalf of the School of Biological Sciences at the University of Chester. Your child's school is not involved in this research project.

**Who may I contact for further information?**

If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

Sian Giddins (Researcher)  
[0916330@chester.ac.uk](mailto:0916330@chester.ac.uk)

Dr Basma Ellahi (Supervisor)  
[b.ellahi@chester.ac.uk](mailto:b.ellahi@chester.ac.uk)  
01244 513090

**Thank you for taking the time to read this information sheet, I hope that you can help me with my research.**

## TAFEN WYBODAETH

### Dealltwriaeth rhieni o'r termau sydd i'w gweld ar flaen pecyn sudd oren

Fy enw i yw Sian Giddins ac rwyf yn astudio am radd meistr mewn Maethyddiaeth lechyd Cyhoeddus ym Mhrifysgol Gaer. Hoffwn eich gwahodd i gymryd rhan yn fy mhrosiect ymchwil. Cyn i chi benderfynu cymryd rhan mae'n bwysig eich bod yn deall pam fod yr ymchwil yn cael ei wneud a beth fydd yn rhaid i chi wneud. Cymerwch eich amser i ddarllen y canlynol, mae croeso i chi drafod hyn gyda unigolion eraill. Os nad ydych yn deall yr hyn sydd yn cael ei ofyn neu os ydych angen mwy o wybodeth mae croeso i chi gysylltu â mi.

Dyma rhai cwestiynnau y dylech feddwl amdanynt.

#### **Beth yw pwrpas y prosiect?**

Trwy'r ymchwil hwn rwyf yn gobeithio darganfod dealltwriaeth rhieni o'r termau sydd yn cael eu defnyddio ar flaen pacedi sudd oren e.e. o dewssudd. Yn ogystal â hyn hoffwn ddarganfod pa ffactorau eraill sy'n dylanwadu ar ba sudd oren rydych yn ei brynu.

#### **Pam yr ydw i wedi cael fy newis?**

Gan fod plant yn yfed gymaint o sudd ffrwythau rwyf wedi penderfynu ymchwilio i ddealltwriaeth rhieni plant ifanc ynglhyr ar geiriau sydd i'w weld ar lableau sudd oren gan mai y rhieni sydd yn fwy debygol o phrynu sudd oren mae'r plant yn ei yfed.

#### **Oes rhaid i mi gymryd rhan?**

Does dim rhaid i chi gymryd rhan yn yr ymchwil hwn. Ond, os ydych yn penderfynu cymryd rhan mi fyddwch yn cadw'r daflen hon. Os ydych wedi cytuno i gymryd rhan yn y prosiect mae gennych hawl i dynnu yn ei ôl heb roi rheswm. Fodd bynnag, gan fod canlyniadau yr holiadur yn aros yn ddienw, unwaith yr ydych wedi dychwelyd yr holiadur i'r ysgol nid yw'n bosib ei thynnu yn ôl.

#### **Os yr wyf am gymryd rhan, beth fydd rhaid i mi wneud?**

Or yr ydych yn penderfynu cymryd rhan cwblhewch yr holiadur sydd wedi ei amgáu. Mi gewch wneud hyn adref a ni ddylai gymryd mwy na hanner awr o'ch amser. Gofynnaf i'r unigolyn sydd yn gwneud y rhan fwyaf o'r siopa bwyd i gwblhau'r holiadur, ac, os yn bosib, ar ben ei hun er mwyn darganfod dealltwriaeth yr unigolyn hwnnw yn unig. Os nad ydych yn deall yr holiadur mi gewch ofyn i deulu neu ffrindiau am help, neu cyswllt wch â mi.

Ar ôl cwblhau'r holiadur a wnewch chi ei ddychwelyd i'r ysgol yn yr amlen a ddarparwyd, wedi ei selio. Mi fyddaf yn ddiolchgar o dderbyn yr holiadur wedi ei lenwi erbyn DYDDIAD.

#### **A oes yna anfantesion neu peryglon o gymryd rhan?**

Nid wyf yn rhagweld unrhyw anfantais neu risg i chi wrth gymryd rhan yn yr ymchwil. Ni chewch niwed, perygl na gofid/tristwch wrth gymryd rhan yn yr ymchwil.

**A oes yna unrhwy fantais o gymryd rhan?**

O ganlyniad i gymryd rhan mae'n bosib ehangu eich dealltwriaeth or termau sydd yn cael eu defnyddion ar flaen pacedi sudd oren, a hwyrach fydd hyn yn eich helpu i wneud dewisiadau gwell yn y dyfodol.

**Beth os fydd rhywbeth yn mynd oi le?**

Os ydych yn dymuno cwyno, neu yn pryderu ar sut y gawsoch eich trin yn ystod y prosiect, cysylltwch â'r Athro Sarah Andrew, Dean of the Faculty of Applied and Health Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ. Ffôn: 01244 513055.

**A fydd y faith fy mod yn cymryd rhan yn yr ymchwil yn aros yn gyfrifnachol?**

Fe fydd yr holl wybodaeth sy'n cael ei gasglu drwy gydol yr ymchwil yn aros yn gyfrifnachol gyda dim ond yr ymchwilydd a'r arolygydd ar hawl i edrych ar yr ymatebion i'r holiadur. Ni chaiff enw neb ei ddefnyddio yn yr adroddiad, ac fe fydd yr holl ddata yn cael eu storio yn ddiogel a'i ddefnyddio'n ddi-enw yn yr adroddiad.

**Beth sydd am ddigwydd i canlyniadau y prosiect ymchwil?**

Dim ond yn fy ymchwil i fydd eich atebion yn cael eu defnyddio, a mi fydd yr adroddiad yn cael ei gadw yn llyfrgell Prifysgol Caer. Ni fydd unigolion o'r prosiect yma yn cael eu henwi yn yr adroddiad yma nac unrhyw addroddiad na chyhoeddiadau dilynol.

**Pwy sy'n trefnu ac yn talu am yr ymchwil?**

Rwyf yn casglu'r wybodaeth hon ar ran Ysgol y Biowyddorau ym Mhrifysgol Gaer. Nid yw'r ysgol yn cymryd rhan yn y prosiect ymchwil.

**Pwy all gysylltu am rhagor o wybodaeth?**

Os ydych angen mwy o wybodaeth cyn penderfynu cymryd rhan cysylltwch â:

Sian Giddins (Ymchwilydd)  
[0916330@chester.ac.uk](mailto:0916330@chester.ac.uk)

Dr Basma Ellahi (Arolygydd)  
[b.ellahi@chester.ac.uk](mailto:b.ellahi@chester.ac.uk)  
01244 513090

**Diolch am gymryd yr amser i ddarllen y wybodeth ac rwyf yn gobeithio y gallwch fy helpu gyda'r ymchwil.**

**Orange Juice Questionnaire**  
**Please return to school by 9<sup>th</sup> July**

In order to gain an understanding of your knowledge on orange juice labelling I would be grateful if you could complete this questionnaire. Not all questions asked directly relate to orange juice labelling but will be used in the study in order to determine which factors determine food purchasing behaviour and how individual circumstances can affect this.

**Instructions**

- ❖ The questionnaire needs to be completed by the household's **main food purchaser**.
- ❖ Please fill in the questionnaire on your own, unless you require help to read and write.
- ❖ This is not a test. If you are unsure of an answer, tick the one that looks right to you at first glance without conducting any research.
- ❖ Please complete one questionnaire per household only – if you have more than one child attending the school, you are only asked to complete one questionnaire.
- ❖ Once the questionnaire has been completed, please place in the envelope provided, seal it and return it to the school. By sealing the envelope you are ensuring your answers will remain confidential.

**Consent: By completeing this questionnaire you are consenting to take part in the study.**

**General** - Questions 1 to 6 are designed to gain some general knowledge about yourself.

**Please tick the appropriate answer (One answer per question).**

1. How knowledgeable would you say you are about nutrition?

Very ☐                      Average ☐                      Not very ☐

2. Do you work in the field of Dietetics or Nutrition?

Yes ☐                      No ☐

3. What age category applies to you?

16 or under ☐                      17-24 ☐                      25-34 ☐  
35-44 ☐                      45 or over ☐

4. What is your gender?

Female

☐

Male

☐

5. Which of the following describes your highest academic qualification?

No qualifications

☐

2+ A-levels/ 4+ AS levels/ NVQ  
L3/ Advanced GNVQ/  
Equivalent

☐

1+ GCSEs (any grade)/ NVQ level  
1/ Foundation Level GNVQ/  
Equivalent

☐

First Degree/ Higher Degree/  
NVQ L4 or 5/ HNC or HND/  
Equivalent

☐

5+ GCSEs (Grades A-C)/ 1+ A or  
AS level/ NVQ L2/ Intermediate  
GNVQ/ Equivalent

☐

Other Qualifications

☐

Please list if other or unsure:

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6. Is your child/children eligible to receive free school dinner?

Yes

☐

No

☐

**Food Shopping Habits** – These questions aim to examine your usual shopping habits and which factors impact your food purchase choice.

**Tick one answer only unless otherwise stated.**

7. How often do you usually go food shopping for the family?

Every day

☐

3-6 times a week

☐

1-2 times a week

☐

Once a fortnight

☐

Once a month

☐

Other- Please state:

8. How much time do you spend food shopping per shopping trip?

Less than 10 minutes

☐

10-30 minutes

☐

30 minutes -1 hour

☐

Over 1 hour

☐

9. Who do you usually go shopping with?

Alone ☐

With children ☐

With another adult ☐

10. Which shops do you usually use to do your **MAIN** food shop? (Please tick up to two)

Convenience store e.g. Spar, One Stop, Premiere Stores ☐

Supermarket:

Tesco

☐

ASDA

☐

Somerfield

☐

Morrisons

☐

Co-Operative

☐

Sainsbury's

☐

Aldi

☐

Lidl

☐

Other type of shop ☐

Other Supermarket (Please State): \_\_\_\_\_

11. Do you consider the effect that food transportation has on the environment e.g. global warming?

Yes ☐

No ☐

**Orange Juice Buying Behaviour** – The questions will determine which factors affect your selection and purchase process in relation to orange juice specifically.

12. How often do you purchase orange juice?

Every day ☐

3-6 times a week ☐

1-2 times a week ☐

Once a fortnight ☐

Once a month ☐

Other- Please state: \_\_\_\_\_

13. What type of orange juice do you buy?

From concentrate ☐ Not from concentrate ☐ Freshly squeezed ☐

Pure juice ☐ Do not know ☐

Other e.g. Sunny Delight(Please State)

\_\_\_\_\_



14. Which type of juice do you think is healthiest?

From concentrate ☐ Not from concentrate ☐ Freshly squeezed ☐  
Pure juice ☐ Do not know ☐  
Other e.g. Sunny Delight (Please State) \_\_\_\_\_

15. Is the juice you regularly buy branded e.g. Tropicana, or the shops own brand?

Branded ☐ Shops Own Brand: Value range ☐  
Standard range ☐  
Premium range ☐

16. Where is the orange juice you buy located in the store?

Chillers ☐ Shelves ☐

17. Please select the 5 main factors influence the type of orange juice you buy, with five being the most important and one being the least important?

Being branded	<input type="checkbox"/>	Being from the chill cabinets	<input type="checkbox"/>
Being supermarket own brands	<input type="checkbox"/>	Price	<input type="checkbox"/>
Nutritional value	<input type="checkbox"/>	Quality	<input type="checkbox"/>
Pressure from others	<input type="checkbox"/>	Pressure from children	<input type="checkbox"/>
Taste	<input type="checkbox"/>	Appearance	<input type="checkbox"/>
Does not contain juicy bits	<input type="checkbox"/>	Contains juicy bits	<input type="checkbox"/>

Other (Please State) \_\_\_\_\_

18. Are these the same factors which apply to all foods and drinks you purchase, excluding the presence of juicy bits?

Yes ☐ No ☐

If no, how do they change?

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19. Do you buy any other types of fruit juice for the household? (Please State)

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**Knowledge of Orange Juice Terminology** – Please briefly state what you think is meant by the following terms.

20. What do you understand by the term 'from concentrate juice'? (Please State)

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21. What do you understand by the term 'not from concentrate'? (Please State)

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22. What do you understand by the term 'pure juice'? (Please State)

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23. What do you understand by the term 'freshly squeezed' juice? (Please State)

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24. What do you understand by the term 'added vitamin C'? (Please State)

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**You may use the rest of this page to further expand on your answers if you desire.**

**Thank you**

**Please do not change your previous answers in response to the following statements, please only select one statement for each question.**

25. Which statement do you think best describes the term 'from concentrate juice'?

'The product contains additives or preservatives' ☐

'The product is concentrated in the UK' ☐

'The product is concentrated in region where the fruit is picked' ☐

'The product is made by removing water from the juice to make concentrate and then later diluting the concentrate back to original strength' ☐

'The product is a juice with concentrate added' ☐

'The product is slightly stronger than normal as water has been removed from the juice' ☐

'The product is slightly more dilute than normal, because the juice concentrate has water added' ☐

26. Which statement do you think best describes the term 'not from concentrate'?

'The is straight from the fruit' ☐

'The product contains juicy bits' ☐

'It is a premium product' ☐

'The product is not processed' ☐

'The product is not concentrated' ☐

'The product has not been diluted' ☐

'The product contains additives or preservatives' ☐

'The product has not been pureed and had added water' ☐

'The product was squeezed abroad and shipped to the UK' ☐

'The product was squeezed in the UK' ☐

27. Which statement do you think best describes the term 'pure juice'?

- 'The product contains no added sugar' ☐
- 'The product has been made from concentrated juice' ☐
- 'The product contains no added vitamin C' ☐
- 'The product contains no added food additives' ☐
- 'The product has not been made from concentrated juice' ☐

28. Which statement do you think best describes the term 'freshly squeezed' juice?

- 'There was a short time between harvesting the fruit and selling the juice in shops' ☐
- 'There was a short time between extracting the juice and selling it in shops' ☐
- 'The juice was made from fruit that has not been stored' ☐
- 'There was a short time between harvesting the fruit and packaging the juice' ☐
- 'There was a short time between extracting the juice and packaging the juice' ☐

29. Which statement do you think best describes the term 'added vitamin C'?

- 'The fruit is genetically modified to contain more vitamin C' ☐
- 'Ascorbic acid is added to the juice during processing and packaging' ☐
- 'Vitamin C is added to the juice during processing and packaging' ☐
- 'The juice contains less water and more oranges than other juices' ☐

30. How often do you refer to orange juice labels?

Never	<input type="checkbox"/>	Rarely	<input type="checkbox"/>
Occasionally	<input type="checkbox"/>	Usually	<input type="checkbox"/>
Always	<input type="checkbox"/>		

31. How easy to understand do you think the labels of orange juice are?

Very Easy	<input type="checkbox"/>	Fairly Easy	<input type="checkbox"/>	Neither easy nor difficult	<input type="checkbox"/>
Fairly difficult	<input type="checkbox"/>	Very Difficult	<input type="checkbox"/>	Don't know	<input type="checkbox"/>

32. On a scale of 1 to 10, please rate the importance of the information provided on the labels of orange juice, with 1 being not important and 10 being very important? (Please Circle)

1	2	3	4	5	6	7	8	9	10
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33. If more information were provided regarding the terms used on orange juice labels would it change the type of juice you bought?

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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Please state why:

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**Thank you for taking the time to complete this questionnaire.**

**Please put the questionnaire into the envelope provided and seal it so that your child or you can return it to school. Alternatively, you can send it to the school by post.**

### Holiadur Sudd Oren

**Gofynnwn bod yr holiaduron yn ôl yn yr ysgol erbyn 9<sup>fed</sup> o Orffennaf**

Er mwyn darganfod eich dealltwriaeth or termau sydd yn cael ei ddefnyddio ar labelau sudd oren fyddwn yn flach os y fuswch mor garedig o ateb yr holiadur hyn. Nid yw phob cwestiwn yn gysylltiedig yn uniongyrchol ar termau sydd yn cael ei ddefnyddio ar labelau sudd oren ond fyddent yn cael ei ddefnyddio er mwyn asesu y ffactorau sydd yn effeithio eich patrymau siopa a sut mae eich sefyllfa yn effeithio hyn.

#### Cyfarwyddiadau

- ❖ Mae angen i'r holiadur cael ei gwblhau gan y person sydd yn gwneud y rhan fwyaf o'r siopa bwyd.
- ❖ Gofynnir i chi lenwi'r holiadur ar eich pen eich hunan, onibai eich bod angen cymorth i ddarllen neu ysgrifennu.
- ❖ Nid yw'r holiadur yn brawf. Gofynnwn i chi ateb yn onest ac, os nad ydych yn siwr o'r ateb, ticiwch yr un agosaf at yr ateb cywir heb ymchwilio i'r ateb cywir.
- ❖ Dim ond un holiadur dylid ei gwblhau ym mhob tŷ – os oes gennych fwy nag un plentyn yn yr ysgol, dim ond un holiadur sydd angen ei lenwi.
- ❖ Unwaith i chi gwblhau'r holiadur, mae angen ei selio yn yr amlen a ddarparwyd a'i yrru yn ôl i'r ysgol. Drwy selio'r amlen rydych yn sicrhau bod eich atebion yn aros yn gyfrifnachol.
- ❖ Peidiwch a sgrifennu eich enw na enw eich plenty ar yr holiadur na'r amlen.

**Caniatâd: Drwy gwblhau'r holiadur yr ydych yn cyntuno l gymryd rhan yn yr ymchwil.**

**Cyffredinol** – Mae cwestiynau 1 i 6 wedi ei ddylunio er mwyn casgu gwybodaeth personol amdano chi.

**Plis ticiwch yr ateb priodol (Un ateb i phob cwestiwn yn unig)**

1. Pa mor wybodus ydych ynglŷn â maethiad?

Da iawn

☐

Go lew

☐

Ddim yn dda

☐

2. Ydych chi'n gweithio yn y maes Deietegydd neu Maethyddiaeth?

Ydw

☐

Nac ydw

☐

3. I ba oedran ydych yn perthyn?

16 neu iau

☐

17-24

☐

25-34

☐

35-44

☐

45 neu throsodd

☐

4. Beth yw eich rhyw?

Benyw

☐

Gwryw

☐

5. Pa gateogri sy'n disgrifio eich lefel uchaf o addysg orau?

Dim cymwysterau

☐

2+ Safon Uwch/ 4+ Uwch  
Gyfrannol/ CGC (NVQ) L3/  
CGCC Uwch (Advanced  
GNVQ)/ cymhwyster cyfwerth

☐

1+ TGAU (unrhyw radd)/ CGC lefel  
1/ CGCC Lefel Sylfaenol  
(Foundation) Cymhwyster  
cyfwerth

☐

First Degree/ Higher Degree/  
NVQ L4 or 5/ HNC or HND/  
Equivalent

☐

5+ TGAU (Graddau A\*-C)/ 1+  
Safon Uwch neu Uwch Gyfrannol /  
CGC L2/ CGCC Canolradd/  
Cymhwyster cyfwerth

☐

Cymhwyster arall

☐

Rhestrwch isod os oes cymhwyster  
arall, neu os ydych yn ansicr :

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6. Ydy eich plentyn yn derbyn cinio am ddim yn yr ysgol?

Ydy

☐

Nac ydy

☐

**Arferion siopa bwyd** – Gofynnir y cwestiynau hyn er mwyn archwilio eich patrymau  
siopa arferol a pha ffactorau sy'n effeithio yr hyn yr ydych yn ei brynu.

**Ticiwch un ateb yn unig oni bai i ble a nodwyr.**

7. Pa mor amal ydych chi'n siopa bwyd i'r teulu?

Pob Dydd,

☐

3-6 yr wythnos

☐

1-2 yr wythnos

☐

Unwaith y pythefnos

☐

Unwaith y mis

☐

Arall: Nodwch

\_\_\_\_\_

8. Faint o amser ydych chi'n gwario yn siopa bwyd fel arfer mewn ymweliad?

Llai na 10 munud

☐

10-30 munud

☐

30 munud – 1 awr

☐

Dros awr

☐



9. Pwy fel arfer sy'n siopa gyda chi?

Neb ☐ Plant ☐ Oedolyn arall ☐

10. Ym mha siopau ydych chi fel arfer yn gwneud eich prif siopa bwyd? (Ticiwch hyd at dau)

Siopau cyfleus e.e. Spar, One Stop, Premiere ☐

Archfarchnad:	Tesco	<input type="checkbox"/>	ASDA	<input type="checkbox"/>
	Somerfield	<input type="checkbox"/>	Morrisons	<input type="checkbox"/>
	Co-Operative	<input type="checkbox"/>	Sainsbury's	<input type="checkbox"/>
	Aldi	<input type="checkbox"/>	Lidl	<input type="checkbox"/>

Arall ☐ Archfarchnad arall (Enwch): \_\_\_\_\_

Nid wyf yn defnyddio un prif siop ☐

11. A yr ydych yn considro yr effaith y mae cludo bwyd o gwmpas y byd yn cael ar ein amgylchedd e.e. eu effaith ar gynhesu byd-eang?

Ydw ☐ Nac ydw ☐

**Patrymau prynu sudd oren** – Mae'r cwestiynau canlynol am edrych yn ddyfnach i pha ffactorau sy'n effeithio pa sudd oren yr ydych yn ei prynu.

12. Pa mor amal ydych chi'n prynu sudd oren?

Pob dydd ☐ 3-6 gwaith yr wythnos ☐

1-2 waith yr wythnos ☐ Unwaith pob pythefnos ☐

Unwaith y mis ☐ Arall- Nodwch o.g.y.dd: \_\_\_\_\_

13. Pa fath o sudd oren ydych chi'n ei brynu?

O dewsudd ☐ Nid o dewsudd ☐ Wedi ei wasgu'n ffres ☐  
(concentrate)

Sudd pur ☐ Wn i ddim ☐

Arall e.e. Sunny Delight (Eglurwch o.g.y.dd)

14. Pa fath ydych chi'n ei gredu yw'r mwyaf iach?

O dewsudd	<input type="checkbox"/>	Nid o dewsudd	<input type="checkbox"/>	Wedi ei wasgu'n ffres	<input type="checkbox"/>
Sudd pur	<input type="checkbox"/>	Wn i ddim	<input type="checkbox"/>		

Arall e.g. Sunny Delight (Eglurwch o.g.y.dd)

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15. Ydy'r sudd a brynwch fel arfer, o fath arbennig e.e. Tropicana, neu frand y siop ei hun?

Brand arbennig	<input type="checkbox"/>	Brand y siop: math 'value'	<input type="checkbox"/>
		Math safonol	<input type="checkbox"/>
		Math 'Premium'	<input type="checkbox"/>

16. Ym mha rhan or siop y mae'r sudd oren rydych yn ei brynu yn cael ei gadw?

Oergell	<input type="checkbox"/>	Silffoedd	<input type="checkbox"/>
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17. Dewiswch y pum ffactor pwysicaf sy'n dylanwadu ar y math o sudd oren y byddwch yn ei brynu. Nodwch y mwyaf pwysig gyda 5, a'r lleiaf pwysig gydag 1.

O frand arbennig	<input type="checkbox"/>	Yn dod o'r oergell	<input type="checkbox"/>
Brand yr archfarchnad ei hun	<input type="checkbox"/>	Pris	<input type="checkbox"/>
Gwerth maeth	<input type="checkbox"/>	Ansawdd	<input type="checkbox"/>
Dylanwad / pwysau pobl eraill	<input type="checkbox"/>	Pwysau gan blant	<input type="checkbox"/>
Blas	<input type="checkbox"/>	Golwg	<input type="checkbox"/>
Heb gynnwys tameidiau bach (juicy bits)	<input type="checkbox"/>	Yn cynnwys tameidiau bach	<input type="checkbox"/>

Arall (nodwch o.g.y.dd)

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18. Ai dyma'r ffactorau sy'n dylanwadu ar yr holl fwydydd a diodydd a brynwch, ar wahan i'r tameidiau bach?

Ie	<input type="checkbox"/>	Nage	<input type="checkbox"/>
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Os nad, ym mha ffordd maent yn wahanol?

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19. Ydych chi'n prynu mathau eraill o sudd ffrwyth ar gyfer y teulu? (Nodwch o.g.y.dd.)

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**Gwybodaeth am Dermau Sudd Oren** – Nodwch yn fyr yr hyn yr ydych chi yn ei feddwl fod y termau canlynol yn ei olygi os gwelwch yn dda.

20. Beth yw ystyr 'o dewsucc' ('from concentrate juice') i chi? (Nodwch o.g.y.dd.)

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21. Beth yw ystyr 'nid o dewsucc' ('not from concentrate') i chi? (Nodwch o.g.y.dd.)

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22. Beth yw ystyr sudd pur ('pure juice') i chi? (Nodwch o.g.y.dd.)

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23. Beth yw ystyr 'sudd wedi ei wasgu'n ffres' ('freshly squeezed' juice) i chi? (Nodwch o.g.y.dd.)

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24. Beth yw ystyr y term 'fiamin C wedi ei ychwanegu' ('added vitamin C')? (Nodwch o.g.y.dd.)

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**Mae croeso i chi ddefnyddio gweddill y dudalen hon i ymhelaethu ar eich atebion, yn ôl eich dymuniad.**  
**Diolch**

**Peidiwch a newid eich atebion blaenorol, os gwelwch yn dda.  
Wrth ymateb i'r datganiadau canlynol, dewiswch dim ond un datganiad ar gyfer pob cwestiwn.**

25. Pa ddatganiad sy'n disgrifio'r term 'o dewsudd' ('from concentrate juice') orau, yn eich tyb chi?

'Mae'r sudd yn cynnwys ychwanegion (additives) neu gadwolion (preservatives)' ☐

'Caiff y sudd ei dewychu yn y DU' ☐

'Caiff y sudd ei dewychu yn yr ardal lle caiff y ffrwythau eu casglu' ☐

'Caiff y nwydd ei wneud trwy dynnu dŵr o'r sudd i greu tewsudd cyn ychwanegu dŵr nes ymlaen i'w adfer i'w gryfder gwreiddiol.' ☐

'Sudd yw'r nwydd gyda thewsuidd wedi ei ychwanegu' ☐

'Mae'r nwydd ychydig yn gryfach na'r cyffredin gan fod dŵr wedi ei dynnu o'r sudd' ☐

'Mae'r nwydd ychydig mwy dyfrllyd na'r cyffredin gan fod dŵr wedi ei ychwanegu i'r tewsuidd' ☐

26. Pa ddatganiad sy'n disgrifio'r term 'nid o dewsudd' ('not from concentrate juice') orau, yn eich tyb chi?

'Mae'r sudd syth or ffrwyth' ☐

'Mae'r sudd yn cynnwys tameidiau bach ( juicy bits)' ☐

'Mae'n nwydd o safon' ☐

'Ni chafodd y nwydd ei brosesu' ☐

'Nid yw'r nwydd yn dewsuidd' ☐

'Ni chafodd dŵr ei ychwanegu at y nwydd' ☐

'Mae'r sudd yn cynnwys ychwanegion a chadwolion' ☐

'Ni chafodd y nwydd ei stwnsho cyn ychwanegu dŵr ato' ☐

'Cafodd y ffrwyth ei wasgu dramor a'i fewnforio i'r DU' ☐

'Cafodd y ffrwyth ei wasgu yn y DU' ☐

27. Pa ddatganiad sy'n disgrifio'r term 'sudd pur' ('pure juice') orau, yn eich tyb chi?

'Nid yw'r nwydd yn cynnwys siwgrwr ychwanegol' ☐

'Cafodd y nwydd ei wneud o dewsud' ☐

'Nid yw'r nwydd yn cynnwys fiamin C ychwanegol' ☐

'Nid yw'r nwydd yn cynnwys ychwanegion bwyd' ☐

'Ni chafodd y nwydd ei wneud o dewsud' ☐

28. Pa ddatganiad sy'n disgrifio'r term 'sudd wedi ei wasgu'n ffres' ('freshly squeezed juice'), yn eich tyb chi?

'Amser byr oedd rhwng casglu'r ffrwythau a gwerthu'r sudd yn y siopau' ☐

'Amser byr oedd rhwng tynnu'r sudd a'i werthu yn y siopau.' ☐

'Cafodd y sudd ei wneud o ffrwythau na chafodd eu storio' ☐

'Amser byr oedd rhwng casglu'r ffrwyth a phe cynnu'r sudd' ☐

'Amser byr oedd rhwng tynnu'r sudd a phe cynnu'r sudd' ☐

29. Pa ddatganiad sy'n disgrifio'r term 'fitamin C ychwanegol' ('added vitamin C') orau, yn eich tyb chi?

'Caiff y ffrwyth ei addasu'n enynol i gynnwys mwy o fitamin C' ☐

'Caiff asid Ascorbig ei ychwanegu at y sudd yn ystod y prosesu a phe cynnu' ☐

'Caiff fitamin C ei ychwanegu at y sudd yn ystod y prosesu a phe cynnu' ☐

'Mae'r sudd yn cynnwys llai o ddŵr a mwy o orenau na suddoedd eraill' ☐

30. Pa mor aml fyddwch chi'n cyfeirio at label sudd oren?

Byth ☐ Yn anaml ☐  
Yn achlysurol ☐ Yn arferol ☐  
Pob tro ☐

31. Pa mor hawdd i'w deall yw labeli sudd oren yn eich tyb chi?

Hawdd iawn ☐ Eitha hawdd ☐ Heb fod yn hawdd nac yn anodd ☐  
Eitha anodd ☐ Anodd iawn ☐ Dwn i ddim ☐

32. Ar raddfa o 1 i 10, nodwch bwysigrwydd y wybodaeth sydd i'w gael ar labeli sudd oren, gydag 1 yn golygu dibwys, a 10 yn golygu pwysig iawn. (Nodwch gyda chylch)

1	2	3	4	5	6	7	8	9	10
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33. Pe byddai mwy o wybodaeth am y termau a ddefnyddir ar labeli sudd oren, a fyddai'n newid y math o sudd a brynnir gennych?

Byddai ☐ Na fyddai ☐

Nodwch pam, o.g.y.dd.:

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**Diolch am gymeryd yr amser i gwblhau yr holiadur.**

**Rhowch yr holiadur yn yr amlen a ddarparwyd a'i selio, os gwelwch yn dda. Mae selio'r amlen yn bwysig er mwyn sicrhau bod eich atebion yn aros yn gyfrifnachol. Cewch ddychwelyd yr holiadur i'r ysgol eich hunan neu drwy eich plentyn.**

## Reminder Slips



Orange Juice Research

Thank you to everyone who has completed the questionnaire for my study investigating consumer knowledge of orange juice terminology. To those of you who have not yet submitted the questionnaire the closing date has been extended to July 14<sup>th</sup>.

Thank you,

Sian Giddins



Ymchwil Sudd Oren

Hoffwn ddiolch pawb sydd wedi cymryd yr amser i gwblhau'r holiadur yngllyn a dealltwriaeth y termau sydd i'w weld ar labelau sudd oren. I'r rhai ohonych sydd heb gwblhau'r holiadur mae'r dyddiad cau wedi ei ymestyn hyd at Orfffenaf 14<sup>eg</sup>.

Diolch yn fawr,

Sian Giddins



As a thank you for taking part in my research I would like to provide you with a fact sheet regarding the terminology used on orange juice labelling. I hope you find this useful for future purchases. This information has been collected and condensed from the Food Standards Agency website for your convenience.

**Juice From Concentrate** – This is a cheaper alternative to producing orange juice as concentrated juice requires any water to be removed from the juice by evaporation to reduce its volume thus reducing transport costs. This concentrated form of orange juice can then be transported in its frozen state to the United Kingdom, or any other country, where it is re-diluted with the same amount of water extracted. The juice is then pasteurised during packaging and can be stored in the chillers or on shelves at room temperature.

**Juice Not from Concentrate** – This can also be known as fruit juice and is classed to be 100% juice. This juice has been produced by collecting the juice directly from pressed oranges which has never had water extracted from the juice and similar to freshly squeezed juice has no water, sugar or preservatives added. This can be produced two ways; both methods involve the juice being pasteurised to preserve freshness. The first method involves collecting and pressing the oranges in the country of which the oranges grow and then transporting the final product, under refrigeration, to the United Kingdom. However, it is also possible to transport the oranges to the UK to be pressed and sold here. The taste of juice not from concentrate differs slightly from juice from concentrate due to packaging processes.

**Pure Juice** – This term can be used to describe juice which contains no additives, this includes the absence of sugar. The term may be applied to describe both concentrate and not from concentrate juice which has been reconstituted with water.

**Freshly Squeezed Juice** – This form of juice has a short time period between the juice extraction from the fruit and sale of the finished product and has an 'use by

date' of less than two weeks. This form of juice can't be made from concentrate and should be kept refrigerated.

**Added Vitamin C** – Ascorbic acid is an active form of this water-soluble vitamin that has many roles in the body. Vitamin C functions as an antioxidant, inhibiting damage to cells and enhancing immune function. It also assists in the formation of collagen, hormones, neurotransmitters, and DNA, and improves iron absorption. Ascorbic acid is added to the juice during the packaging stages or orange juice production to create juice with added vitamin C.

**Juicy Bits** - These are cells from the fleshy parts of the oranges and are often separated from the juice during concentration or pasteurisation but can be added back to the juice at a later date.

Er mwyn diolch i chi am gymryd rhan yn fy mhrosiect hoffwn ddarparu daflen wybodeth i chwi yn egluro y termau sydd iw weld ar labelau sudd oren. Rwyf yn gobethio fydd hyn o help i chwi y tro nesa rydych yn mynd siopa. Mae'r holl wybodaeth ar y daflen wedi ei gasglu or wefan Asiantaeth Safonau Bwyd ar gyfer eich hwylusdod chi.

**Sudd o dewsuccd ('from concentrate juice')** – Mae'r math hyn o sudd yn rhatach iw gynhyrchu na maethau arall gan fod unrhyw ddŵr yn y sudd yn cael ei gymryd allan felly yn lleihau y le y maer sudd ei angen ar gyfer cludiant. Ar ôl ei rhewi mae'r dewsuccd yn cael eu gludo i'r Deyrans Unedig, neu unrhyw wlad arall, ble mae'r union run faint o ddŵr yn cael ei ychwanegu yn nôl a gafodd ei gymryd allan or sudd. Nesa mae'r sudd yn cael ei pasteureiddio wrth cael ei bacio a gellir ei storio mewn oergell neu ar silffoedd ar dymheredd ystafell.

**Sudd ddim o dewsuccd (Juice Not from Concentrate)** – Gellir hwn hefyd cael ei enwi fel sudd ffrwythau a maen rhaid iddo fod 100% sudd yn unig. Mae'r sudd yn cael ei gynhyrchu drwy gasglu sudd o'r oren yn uniongyrchol a nid yw dŵr yn cael ei dynnu allan. Yn debyg i sudd wedi ei wasgu'n ffres nid oes dŵr, siwgr na chemegion cadwrol (preservatives) wedi eu ychwanegu. Gall y sudd hyn gael ei gynhyrchu mewn dwy ffordd; mae'r ddau dull angen i'r sudd gael eu basteureiddio er mwyn arbed ffresni. Yn y dull cynta maer orenau yn cael ei gasglu au gwasgu yn y gwald y mae'r orenau yn tyfu ac yna mae'r sudd yn cael ei gludo, mewn oergell i'r DU. Mae hefyd yn bosib i gludo'r orenau i'r DU er mwyn eu gwasgu fan hyn. Mae'r blas sudd o dewsuccd chydig yn wahanol i sudd ddim o dewsuccd o ganlyniad i sut y mae'r sudd yn cael ei bacio.

**Sudd Pur (Pure Juice)** – Gall y term hon cael ei ddefnyddio i ddisgrifio sudd sydd ddim yn cynnwys cemegau ychwanegol, er enghraifft siwgr. Gall y term cael ei ddefnyddio i ddisgrifio sudd o dewsuccd a sudd ddim o dewsuccd ble mae dim ond dŵr sydd wedi ei ychwanegu.

**Sudd wedi ei wasgu'n ffres (Freshly Squeezed Juice)** – Mae gan y math hyn o sudd cyfnod byr rhwng gwasgu'r ffrwyth ar dydd y mae'r sudd yn cael ei wasgu a

mae ganddo dyddiad i'w 'ddefnyddio erbyn' o lai na 2 wythnos. Ni ellir cynhyrchu y math hyn o sudd o dewsudd a mae'n rhaid iddo aros o fewn oergell.

**Fitamin C wedi ei ychwanegu (Added Vitamin C)** – Asid asgosborig yw'r rhan actif a fitamin C sydd yn hydawdd mewn dŵr ac y mae'n bwysig mewn nifer o phrosesau y corff. Er enghriaft, gall fitamin C ymddwyn fel wrthocsidiol (antioxidant), yn gwahardd niwed i gellodd a gwella ffwythiant y system imiwn. Y mae hefyd yn helpu creu collagen, hormonau, trosglwyddwyr-niwro (neurotransmitters) a DNA yn ogystal a gwella amsugnad haearn or diet. Caiff asid asgosborig ei ychwanegu o sudd oren pryd y mae yn cael ei bacio i chreu sudd sydd hefo fitamin C wedi ei ychwanegu.

**Yn cynnwys tameidiau bach (Juicy Bits)** – Rhein yw celloedd y oren a fel arfer cant ei wahanu or sudd pryd maent yn cael ei droi i dewsudd neu yn cael ei phasteureiddio ond gallent cael ei ychwanegu yn nol ir sudd nes ymlaen.

## Appendix V – Ethical Approval



University of  
Chester

Faculty of Applied and Health Sciences  
Research Ethics Committee

Chester Campus

Tel 01244 511740

Fax 01244 511302

j.hiddcock@chester.ac.uk

Sian Giddins

28 June 2010

Dear Sian

**Study title:** Parents' understanding of front-of-pack orange juice labelling  
**FREC reference:** 418/10/SG/BIOL  
**Version number:** 2

Thank you for sending your application to the Faculty of Applied and Health Sciences Research Ethics Committee for review.

I am pleased to confirm a favourable ethical opinion for the above research, provided that you comply with the conditions set out in the attached document, and adhere to the processes described in your application form and supporting documentation.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	2	June 2010
List of references	2	June 2010
Summary CV of applicant	-	June 2010
Letters of permission from schools	-	June 2010
Letter of invitation to parents	2	June 2010
Participant information sheet	2	June 2010
Questionnaire	2	June 2010
Justification for choice of questions	2	June 2010
Orange juice information sheet	2	June 2010
Sample size calculation	2	June 2010
Response to FREC request for clarifications	1	June 2010

With the Committee's best wishes for the success of this project.

University of Chester, Parkgate Road, Chester CH1 4BJ • Tel 01244 511000 • Fax 01244 511300 • [www.chester.ac.uk](http://www.chester.ac.uk)  
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Yours sincerely,

**Prof. Cynthia Burek**  
Chair, Faculty Research Ethics Committee

Enclosures Standard conditions of approval.

c.c. Supervisor  
FREC Representative